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# ONR Europe Reports

93-3-R

**The East German Research Landscape in Transition**

**Part B: Non-University Institutes**

**Hans Dolezalek**

**2 March 1993**



**93-11793**



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**Office of Naval Research European Office**

Remark on the

#### PAGINATION

used in this Report B:

This Report consists of 8 "Main Chapters". Most of them have several "Chapters".

There are, however, no through-going page numbers in this report, and the Table of Contents does not contain page numbers either.

Instead, we find in the upper right corner of each page a number which begins with G704W.... Disconsider these first five digits of the number<sup>1</sup>.

What follows after these first five digits indicates the Main Chapters and the Chapters, in the following form:

ab-cc

in which a is the number of the Main Chapter, b is the number of the Chapter (within that Main Chapter), and cc is the number of the page within that Chapter.

The date given under this number refers to the day when the last change on that page has been made.

On pages which contain descriptions of institutions, between the page number and the date, the #-number of the institute(s) described is given. If the same institute is described on more than one page, the page number of that particular description is given after a /.

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<sup>1</sup>) This system was used because the report was written in a parallel fashion: many chapters were begun and finished at the same time. The system was maintained to make future additions possible without changing the whole page counting every time. The first five digits refer to the labels of the diskettes used for the various drafts of the report.

# **The East-German Research Landscape In Transition**

## **Part B: Non-university Institutes**

*by Hans Dolezaleck, who was the Liaison Scientist for Oceans and the Atmosphere at the Office of Naval Research European Office. He is currently a Scientific Officer in the Ocean Technology Division at the Office of Naval Research, Arlington, Virginia.*

**This is the second report in a series of three on the East-German Research Landscape In Transition:**

**Part A: Status and Transition (93-2-R)**

**Part B: Non-university Institutes (93-3-R)**

**Part C: Research at East-German Universities (93-4-R)**

**They are being published without the customary technical editing process usually applied to the publishing of ONR Europe Reports. This is necessitated by a desire to preserve the timeliness of the contents in this series.**

**ONR Europe wishes to thank Hans Dolezalek and his wife, Lotte Dolezalek, for the major commitment and dedication that they invested in this series of reports.**

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THE EAST-GERMAN "RESEARCH LANDSCAPE" IN TRANSITION  
Information for Scientific Collaboration with East-Germany  
Including Surveys on Structure of Research in the FRG

---

with the assistance of many colleagues compiled by

Hans Dolezalek

and the collaboration in travel and visits,  
and in collecting, translating, writing, and pre-editing by  
Lotte Dolezalek

PART A: STATUS AND TRANSITION (93-2-R)

PART B: NON-UNIVERSITY INSTITUTES (93-3-R)

PART C: RESEARCH AT EAST-GERMAN UNIVERSITIES (93-4-R)

Opinions and statements in this REPORT are the author's, and must not be interpreted as positions of the Office of Naval Research, Office of Naval Research European Office, or the United States Navy.

1992

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OFFICE OF NAVAL RESEARCH EUROPEAN OFFICE  
223-231 Old Marylebone Road  
London NW1 5TH  
UNITED KINGDOM



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PART B:

DESCRIPTION OF NON-UNIVERSITY

RESEARCH INSTITUTES IN THE

FIVE NEW LÄNDER AND EAST BERLIN

OF THE FEDERAL REPUBLIC OF GERMANY

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with the following main chapters:

1. Preface
2. Executive Summary
3. Overviews on a few selected scientific areas or on research in a few selected regions
4. National Research Labs and Institutes of the Blue List
5. Fraunhofer Establishments and Branch Labs
6. Max Planck Institutes, Working Groups, and Branch Institutes
7. Other institutes
8. Indices
9. Dissolved institutes, invalid institute names

Part A of this REPORT gives a survey on the structure of research in Germany and describes the transition of the East-German Research Landscape.

The later Part C is intended to give an overview of research at universities, including an introduction describing the particular situation of university research in the former "German Democratic Republic" including the newly-founded universities. For one university a relatively complete survey on scientific areas treated by its institutes will be given, plus selected other examples.

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**Chapter 8.5. Science Keywords, alphabetical**

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\*) Karl-Marx-Stadt, see Chemnitz; Saxonia, see Sachsen; Thuringia, see Thüringen;  
Pomerania or Western Pomerania, see Vorpommern under Mecklenburg-Vorpommern.

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MAIN CHAPTER 1:

P R E F A C E  
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## CHAPTER 1.1

### INTRODUCTION TO INSTITUTE DESCRIPTIONS

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#### 1.1.1. Discussion of the Scope of this REPORT

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The re-unification of Germany in 1989/1992 set in motion an almost complete reform of what the Germans now like to call the "Research Landscape" in the five new länder and East-Berlin. To remain in this picture, we observed that many a forest has been turned into an acre, some acres into meadows and vice-versa, trees have been uprooted and newly planted, borders between pieces of land obliterated and redrawn, new seeds and even grown-up trees imported and planted - yet not all the new plants grew as hoped for. - More in concepts of scientific research, we find that it is of interest to know how the landscape was before because the talents at work then did not disappear; it is, however more important to see what the result of all these changes will be. In some cases one would like to follow the transition process itself because it tells us something about the potential. To write a report on these changes requests the collection of information from many sources which will take months to do; in these months further changes will occur. All this is basically a non-political process but has to be implemented in the political arena consequently creating controversy and opposing opinions.

Is it possible to write a reliable report under these circumstances? However, an incomplete and very varied report, complete in some parts, giving only hints in others, putting side-by-side developments which occurred at different times - even such a fragile result seemed to be worthwhile.

Therefore, it was tried.

#### 1.1.2. A Brief Look at the Recent History

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After the German re-unification of 03 October 1990, carefully planned efforts were made to create a new "research landscape" in the five new länder of the Federal Republic and in East-Berlin; for details see Part A of this report. Beyond the transformation of the existing research institutions following the model of the West-German paradigm, new requirements were established. The "Wissenschaftsrat" of the (old) Federal Republic of Germany generated recommendations to be carried out in part by the Federal Government, and in part by the Governments of the new Länder and of Berlin. Parallel to that, the existing West-German research organizations expanded their interest to the new territory by creating in situ new institutions, in agreement with the Wissenschaftsrat.

On 29 November 1991, the Federal Ministry of Research and Technology in Bonn presented to the Bundestag (parliament) a report on the status of the transformation and on 22-24 January 1992, the federal and länder ministries jointly submitted a report at a special conference in Berlin-Wannsee. At about this time and soon thereafter, the cognizant agencies compiled and published lists and, in part, also short descriptions of the new institutions. This material has been taken as the basis for our descriptions of the institutions, amplified by what the authors collected themselves during visits in the five new länder and East-Berlin and thereafter. Finally, reports received from American scientists visiting East-German institutes as well as publications in the German or international press are also incorporated.

There are about 300 surviving research institutions in the five new länder and East-Berlin. This does not include research-performing university institutes; their future was generally decided at a later time. Here, we shall concentrate on the non-university institutes which carry out basic research and exploratory development as their main task. There is, however, little doubt that engineering and development institutions (of which there are several hundred) and also the very numerous agricultural institutes often will also have some basic research activities. Some official material on these institutions is on hand, and the authors are ready to assist in tracking them down if that is desired.

#### 1.1.3 .The Sources for the Information

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The basic source has been mentioned in the preceding section. A more complete review follows here.

In Part A of this REPORT there are many government and other agencies and organizations mentioned, often with some indication on their activities. The authors of this REPORT have used them all as sources for information. In as many cases as possible, the institutions to be described have been asked to provide their own information, either by us visiting them or by correspondence or telephone discussion, but the greater amount of information has been extracted from compilations of agency information, above all the Wissenschaftsrat, the Federal Ministry of Research and Technology, the Deutsche Forschungsgemeinschaft, the Max-Planck and Fraunhofer Societies, the cognizant ministries in the five länder and the corresponding office of Berlin and the central organizations of the various institute carriers.

The following list of abbreviations gives a survey. These abbreviations are used to identify the sources in each of the descriptions. Texts on the same institute from different sources do

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not always agree or may even contradict each other. This is, in particular, the case when the texts have been written at different times. It should, however, not be assumed that the latest description is always the most important one for the American reader: earlier intentions and earlier activities, even if (temporarily?) abandoned later, may still give us clues about the talents and interests.

## CHAPTER 1.2

### GENERAL ORGANIZATION, ABBREVIATIONS, ETC.

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#### 1.2.1. General Organization of Part B

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Institutes, Establishments, Centers, Laboratories, Branch Institutes, Branch Labs. etc. to be described in this part (Part B) of the REPORT on the East-German Research Landscape in Transition, rather often changed their names; also several English translation of the same German name sometimes produced different English titles. It was therefore mandatory to assign to each unit a number and to keep the same number throughout. The first nearly complete survey on the new institutes etc., edited under the name

Kurzdarstellungen  
der neuen Forschungs-Einrichtungen  
in den neuen Ländern und Berlin  
(Pressedokumentation 03/92)

[translated:  
Short Descriptions  
of the new Research institutions  
in the new Länder and Berlin  
(Press Release 03/92)]

on 10 January 1992 listed almost 100 institutions in four groups:

GroßForschungseinrichtungen (National Research Labs)  
Institute der Blauen Liste (Institutes of the Blue List)  
Fraunhofer Einrichtungen (Fraunhofer Establishments)  
Fraunhofer Außenstellen (Fraunhofer Branch Labs)  
Max-Planck Institute und Arbeitsgruppen (Max-Planck Institutes  
and Working Groups),

and dedicated one page to each institution. We decided to take the page numbers of that list as the basis for our numbers, and to write each number with three digits, preceded by a pound sign (#). - Institutes which were not contained in this list, have been and are being given numbers beyond #100 to, if necessary, #999, in various groups (see Table of Contents). - (University institutes, to be partially listed in Part C of this REPORT, will have #numbers with four digits, the first digit indicating in which land they are, the second digit defining the particular university).



### 1.2.2. Classification of Sources of Information with Abbreviations

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As indicated above in chapter 1.1, our information was derived from a variety of sources. Whenever possible, this source and the approximate month and year when received, will be identified at the beginning of each description in the following way: #number, star (\*), abbreviation (see below), month and year, again a star (\*).

For the identification of the sources, the following abbreviations will be used:

B = Information provided by the organization of the Blue-List institutions

E = Information received from American Embassy Bonn

F = Information provided by the Fraunhofer Society

G = Information provided by the organization of the Großforschungs-Einrichtungen (National Research Labs).

I = Information provided directly by institute in question (other than Q, see below)

J = Information taken from journals and other media

K = "Kurzdarstellungen", i.e. the list described above in 1.2.1., with the following additional definitions:

K1 = Original text of "Kurzdarstellungen"

K2 = Machine translation

K3 = translation by L.D.

M = Information provided by a government ministry, with the following additional definitions:

M1 = Federal Ministry of Research & Technology (except K)

M2 = Other Federal Ministries or Embassy Washington

M3 = Senatsverwaltung Berlin

M4 = Government Brandenburg

M5 = Government Mecklenburg-Vorpommern

M6 = Government Sachsen (Saxonia)

M7 = Government Sachsen-Anhalt

M8 = Government Thüringen (Thuringia)

M9 = Other government agencies

N = Information received for the European Office of the National Science Foundation in Paris

O = Information provided by ONR Europe, the European Office of the Office of Naval Research, with additional definitions as follows:

O1 = from ONR Europe in general

O2 = from Report to ONR Europe submitted by Prof. Kornguth

O3 = from Report to ONR Europe submitted by Dr. John Dugan

P = Information provided by the Max-Planck Society

Q = Information based on our questionnaire (see chapter 1.3, below) with the following additional definitions:

Q1 = Questionnaire filled in by the institute to be described, using the English language;

Q2 = the same but provided in German, translated by us;

Q3 = questionnaire completed by us in the presence of a scientist from the institute to be described;

Q4 = questionnaire completed by us on the basis of information received earlier;

Q5 = questionnaire completed by us in advance.

U = unknown source, usually an oral discussion

W = Information provided by the Wissenschaftsrat

Z = Other information, refer to foot note on that page.

### Chapter 1.3. The "Questionnaire"

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Information on the new institutions was collected during a four-week trip through the new federal länder and Berlin in October 1991 and by subsequent correspondence. Some information was assembled using a Questionnaire, developed during this trip and slightly refined thereafter (keeping, however, the established question numbers).

This Questionnaire is reproduced on the following pages.

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VORGESCHLAGENER FRAGEBOGEN  
ZUR ERFASSUNG DER FORSCHUNG AN INSTITUTEN  
IN DEN FÜNF NEUEN LÄNDERN  
=====

Zur Einführung:  
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1. Nicht beantwortete Fragen gelten als nicht gestellt.
2. Wichtig sind vor allem die Fragen unter 1 und 3. Fragen unter 2 und 4 usw. sind mehr als Gelegenheiten gedacht, darzustellen was von dem Institut selber oder seinem Direktor als wichtig angesehen wird.
3. Wenn die Beantwortung auf Englisch zu schwierig ist, bitte wenigstens versuchen, den Fachausdrücken die englische Bezeichnung beizufügen, um fehlerhafte Übersetzungen zu vermeiden.

4. Antwort bitte senden mit Luftpost an:  
Hans Dolezalek  
Code 1121CS  
Office of Naval Research  
800 North Quincy Street  
Arlington, Virginia, 22217-5000  
USA.

oder mit Telefax: +1 (703) 696-4884 oder 696-2710.

5. Telefonische Rückfragen:  
im Büro: +1 (703) 696-8128  
zuhaus: +1 (703) 765-3771
6. Telex, Büro oder zuhaus: 7400828 hadu uc
7. Die Angaben sollen verwertet werden für einen relativ umfangreichen Bericht über wissenschaftliche Forschung in den fünf neuen Ländern der Bundesrepublik Deutschland und Ost-Berlin; zur Veröffentlichung vorgesehen in dem EUROPEAN SCIENCE NOTES INFORMATION BULLETIN, herausgegeben vom Office of Naval Research Europe in London. Sie kommen auf diese Weise zur Kenntnis von einigen tausend Forschung fördernden und Forschung betreibenden Institutionen vornehmlich in den USA.
8. Die Hoffnung ist, auf diese Weise eine Grundlage zu schaffen, die einer wissenschaftlichen Diskussion oder Zusammenarbeit zwischen amerikanischen Forschern (vornehmlich an Universitäten) und ihren deutschen Kollegen förderlich ist.

Fuer Ihre Mithilfe herzlichen Dank!

Hans Dolezalek

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FEBRUARY 1992

SUGGESTED QUESTIONNAIRE  
TO OBTAIN INFORMATION ON RESEARCH  
IN THE FIVE NEW LÄNDER  
=====

As an Introduction:  
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1. Questions which are not answered are considered as not being asked.
2. Important are the questions under 1 and 3. The questions under 2, 4 etc., are considered as providing occasions for institute directors to better present their institute.
3. In case it should be too difficult to provide answers in English, please try to translate at least the technical terms, so that wrong translations can be avoided.
4. Please airmail the answer to:

Hans Dolezalek  
Code 1121CS  
Office of Naval Research  
800 North Quincy Street  
Arlington, Virginia, 22217-5000  
USA.

or by telefax: +1 (703) 696-4884 or 696-2710.

5. Telephonic inquiries:

office: +1 (703) 696-8128

home: +1 (703) 765-3771

6. Telex, office or home: 7400828 hadu uc
7. The answers are intended to be applied to a comprehensive report on scientific research in the five new länder of the Federal Republic of Germany; a publication is planned in the EUROPEAN SCIENCE NOTES INFORMATION BULLETIN or as a special Report. This bulletin or the Report will be issued by the Office of Naval Research Europe in London. In this way, the information will reach several thousand agencies and institutes which promote or do research, mostly in the USA.
8. This is done in the hope to promote scientific discussion or collaboration between American scientists (especially at universities) and their German colleagues.

Thank you for your consideration,

Hans Dolezalek

## 1. GENERAL SURVEY

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### 1.1. Address, Telephone, etc.:

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Exact name of institute in German, plus English translation in parentheses (to avoid ad hoc translations which may be erroneous, it is recommended that the institute itself determine its name or title in English)

Full postal (mailing) address

Telephone(s) Indicate clearly the town code & whether West or East

Telefax(es) (as with telephone)

Telex(es)

Electronic mail address if available

### 1.2. Setting, Environment, Access:

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For some institutes the setting is important (in a town, a suburb, a forest, at a river, the Sea, etc.) for its mission (e.g., an astronomic observatory in open country, remote from cities and factories). Access: how to get there; visitors' address if different from mailing address, how to find the institute by car or taxicab, etc.

### 1.3. Organization, Structure, Hierarchy, Director:

---

Legal form of organization (GmbH, eV, government....). Of which "larger" institution is the institute a part? For example: "Ad-Institute" ("An-Institut") to which university or polytechnical institute? Fraunhofer-Aussenstelle to which Fraunhofer Institute? - Has the institute an inner organization (departments, branches, etc.)?

What is the position title of the responsible head of the institute? Title and names of person(s) responsible at present.

### 1.4. Employees:

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How many scientists, how many technicians, how many support staff are employed after 01 January 1992? How many "soft money" ("Dritt-Mittel") fellow-workers are expected in addition?

### 1.5. Institute Publications, Host Conferences:

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In addition to papers by employees of the institute published in journals or at conferences, does the institute publish its own journal or regular or irregular series of scientific reports? Does the institute conduct its own conferences? If so, irregular or periodic?

## 2. HISTORY OF THE INSTITUTE

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### 2.1. Long-Term History, Founding of the Institute, Tradition:

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Describe in broad terms the founding and development of the institute.

### 2.2. Recent History:

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If you want to report important events of the recent history in more detail; but for changes etc. related to the present reformation use below, section 4.

## 3. RESEARCH (this is the main part of the questionnaire)

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### 3.1. Scientific areas covered:

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The answer to this question may be anywhere from one paragraph to 2 or even 3 pages. Envision a colleague in the USA who is looking for a partner to discuss certain scientific problems or to investigate the possibility of collaboration - what must he know about your institute if it is of potential interest to him?

### 3.2. Specific scientific activities:

-----

In this section, there may be mentioned specific activity within the covered areas, expected to be of interest to the American colleagues, but also scientific activities of a specific nature which are outside of the general areas covered.

### 3.3. Problems worked on before 31 December 1991:

-----

Mention the scientific areas which have been or are in the process of being terminated, especially those for which scientific expertise of the institute's employees is being called for.

### 3.4. Future scientific problems envisioned:

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Are there important future activities of the institute which may come into being in a few years hence?

#### 4. GERMAN UNIFICATION, TRANSITION

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##### 4.1. Wissenschaftsrat (Science Council):

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Did the Wissenschaftsrat investigate this institute and what was the result? In which way have its recommendations been implemented if at all?

##### 4.2. Special problems of an administrative (i.e. not scientific) character:

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For example, availability of sufficient computer systems, foreign journals, travels to the West, travels to the East, data exchange with the West etc. during the time of the DDR? How will that change? Is an improvement already visible? Which specific help from the West is being provided in these fields?

##### 4.3. International Contacts:

-----

What was the situation before, what is it now, what will it be tomorrow? What is the realistic possibility and what is the desirability to maintain the contacts with the former USSR, or with other East-Block countries? Danger of losing valuable collaboration?

##### 4.4. Scientific problems to be abandoned after 01 January 1992:

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In general, but also specifically, problem solving for industry; nature of proposed streamlining of research ("gestrafftes Programm").

##### 4.5. Released scientists:

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Percentage of scientists having lost their job in this field, in this institute or from its predecessor? Absolute numbers? What will happen to them? Special programs (beyond the official ABM)?

#### 5. SPECIFIC PROBLEMS, POTENTIAL ONR EUROPE SUPPORT, ETC.

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If you want, list here problems you encounter which cannot be fitted into the preceding sections; what kind of collaboration with American scientists could you envision, if any?

#### 6., 7., 8.: RESERVED FOR OWN PURPOSES.

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#### 9. ADDITIONAL INFORMATION

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Whatever you like to provide.



#### Chapter 1.4:

##### Sources for Additional Information

The present REPORT was written and edited at a time when many arrangements in the five new länder and in East-Berlin were not yet final, variations abounded and information items contradicted each other frequently. Also, to no one's surprise, often the desired information was not provided by the one or other source. It was, nevertheless, decided to finalize the REPORT and not to wait until things have settled down. Whether updates will be considered desirable is not yet known.

Sources for future information are, of course, all the agencies and organizations listed in Part A, and, in particular in its chapter 4.7.

Special efforts, set up in order to give information of this kind, in Germany (directed also to foreign countries) and in the USA (collecting especially German information) do exist\*. Two of them will be described here. Both are organized to keep their information up to date by either regular follow-up issues or by receiving continuously new information and holding it ready for users.

In Stuttgart in Germany works the Dr. Josef Raabe Verlag, a publishing house specializing in producing information sources on education and research, some of which are well-known under the name "Vademecum". This Verlag now prepares the probably most complete information source on research in Germany, quoting over 3,000 institutions and providing much information on each, both in German and in English. Institute carrier and inner organization, names of contact persons and of directors, all telephone etc. numbers, the location in various classification schemes, and descriptions of scientific projects and of offers to do science - for both West- and East-Germany. The description of research activities have an average length of about 20 lines\*\*. This source is not a book, it is a CD ROM, i.e. to use it one needs a CD drive for the computer. This computer, at present, should be IBM or IBM-compatible,

\*) one of these two has already been briefly mentioned in Part A of this REPORT in chapter 4.7

\*\*) i.e., they are more complete than some of the ones in our present REPORT, but also much less complete than others here. Also, in the present REPORT, information on history and on certain background issues is given for a number of institutes which may not be found in the new collection indicated here.

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versions for McIntosh are under consideration. Minimum requirements for the computer are:

AT 286 or higher; MS-DOS 3.0 or higher; Working storage at least 640 kbyte of which at least 512 kbyte are free); and CD-ROM driver. There is an additional retrieval system which can be provided on 3½ or 5¼ diskettes.

The cost is in the order of \$2,000, the regular updates will be a bit more than half of that. The first delivery is scheduled for November 1992. The address is:

Dr. Josef Raabe Verlags-GmbH  
Rotbühl Straße 51A  
D/W-7000 Stuttgart 1  
Telephone: +49 (711) 62900-43 or 62900-0  
Telefax: +49 (711) 62900-10

contact person in charge: Dr. Andrea Wolter.

The other continuing source is a special collection at the Library of Congress in Washington. The authors of this REPORT are asking relevant sources in Germany to routinely forward information material to that collection so that they enter the American library system under a special heading and can be used accordingly. All sources asked so far have agreed; our efforts continue. The address is:

Dr. John Feulner  
Director, Technical Reports Section  
Science and Technology Division  
The Library of Congress  
Washington, DC, 20540  
Telephone: +1 (202) 707-5664  
Telefax: +1 (202) 707-1925.

## Chapter 1.5:

### Acknowledgements

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A general but nevertheless very strong acknowledgement is due. It is evident that to write this report we had to ask for assistance in very many cases, e.g., asking to provide information, to help find still unknown facts, and so on. We should like to state here that in all cases, our requests were accepted with friendly interest, all our questions were freely answered, and many of the institutions in East-Germany responded by extending a significant effort to help us - and so did people, agencies and organizations in West-Germany. While writing, re-writing, re-arranging and again and again correcting our text was fraught with frustrations, and establishing telephone or telefax connections was often a hard exercise in patience and straining the good humor - all our contacts with the people over there were easy, open, often spiced with humor, factual and efficient, cheerful and in general enjoyable indeed.

We do not quote any individual names here. If we should do justice to all, the list would be several pages long. Some names have been quoted in the Acknowledgement chapter of Part A of this REPORT (which will probably find a wider distribution than this Part B).

THE EAST-GERMAN RESEARCH LANDSCAPE IN TRANSITION, Part C

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Main Chapter 5: RESEARCH AT THE JENA UNIVERSITY (except  
medicine and humanities):

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Main Chapter 6: INDICES

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Main Chapter 2:

EXECUTIVE SUMMARY  
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contains: Executive Summary

EXECUTIVE SUMMARY  
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During the time in which the "Research-Landscape" in the region of the former German Democratic Republic was transformed to become a part of the overall German research effort, the scientific work not only there but everywhere continued. A certain degree of continuity in describing the present and developing situation in that region, relating it to the former one, was desired. That was one reason why in Part A of this REPORT we presented to the reader a relatively elaborate description of the transition process and of the marginal events accompanying it. A second reason was given by the fact that one cannot describe the emerging situation in the five new länder and in East-Berlin without also providing a certain degree of information on the structure of scientific research as it existed in the Federal Republic of Germany prior to the reunification of the country.

A third reason was the assumption that there may be readers who are more interested in getting general information on the (West-German) basic structure and its extension to the new länder and East-Berlin than in detailed descriptions of the scientific activities of the individual institutes there.

In Part A, individual non-university research institutes were listed only with their names (including ad-hoc English translations) and addresses; detailed descriptions are presented here in Part B. With regard to university research, Part A lists only the universities with their addresses and phone numbers while more will be said in Part C, now in preparation.

After Part A had been submitted to the editor, in an effort not to postpone its publication too long, and while Part B was in preparation, additional changes did occur in the East-German research landscape. In as much as possible, these changes were incorporated in Part B even if they are not indicated in Part A. Therefore, some discontinuities between Parts A and B do occur.

In compiling the information for Part B, a decision had to be made. The amount and detail, as well as the timeliness of the information obtained from the various German and non-German sources was extremely uneven. It was decided to forgo any attempt of balancing the material to be presented. Instead as much information as possible is included. Even if a more recent source contradicted some earlier statements, both are presented, each with its date. It is in the nature of scientific research that disbanded programs have a certain value, too: they show interest and expertise of the programmers, and they may come up again at a later time (especially if some outside curiosity would be felt).

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Main Chapter 3  
OVERVIEWS  
ON TWO SELECTED SCIENTIFIC AREAS  
AND ON EAST BERLIN

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contains:

Chapter 3.1: Introduction  
Chapter 3.2: Biology  
Chapter 3.3: Environment and Ecology  
Chapter 3.4: Region of East-Berlin

Chapter 3.1:

INTRODUCTION TO OVERVIEWS  
=====

This is only a small selection. Overviews on the situation of scientific research in the five new länder of the Federal Republic of Germany and in East-Berlin have been written in great numbers, and some of them are excellent, originating from senior scientists, mostly Germans, and often in the fulfillment of an official request. In particular, the compositions presented by the Wissenschaftsrat are recommendable, for example the ones in collected in the series

Stellungnahmen  
zu den außeruniversitären Forschungseinrichtungen  
in den neuen Ländern und in Berlin.  
(Herausgegeben vom Wissenschaftsrat 1992).

In the ten volumes, we found the text on pages 81-117 of the volume "Allgemeiner Teil" especially rewarding reading. It is, of course, in German and according to our information, no English translation is planned.

In addition, since travel by citizens of the USA had always been possible in the former GDR, we also have some overviews written by such visitors. They are in English and we are presenting one such overview in Chapter 3.2. A new general report on the Max-Planck Society arrived at our desks after Part A of this REPORT had been finally edited. It is written by the then European Representative of the National Science Foundation and contains information which is so interesting, that we add it here in Chapter 3.5, amplifying our description in chapter 4.5.2.1 of Part A.

Almost all these overviews were not written with the present REPORT in mind. Depending on the interests of the particular author, and on the task he may have been asked to fulfill, they are mostly restricted to selected areas within the broader scientific discipline indicated in our headlines.



## Chapter 3.2

### Biology

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Report to ONR Europe (London) from Dr. Kornguth

During the period between October 18-25, 1991, I had the opportunity to visit with scientists in several Biotechnology laboratories formerly associated with the Academy of Sciences of the German Democratic Republic. The sites visited included the Central Institute for Molecular Biology at Berlin-Buch, the Institute for Neurobiology and Brain Research in Magdeburg, the Institute for Plant Research and Genetics in Gatersleben, and the Biochemistry Faculty of the University Medical Center in Leipzig. In association with the Biotechnica Fair held in Hannover, Oct 22-24, discussions were held with researchers and managers of the Institute for Microbiology and Experimental Therapy (ZIMET) in Jena and of the Research Center for Biotechnology (FZB) in Berlin. FZB and ZIMET previously functioned as components of the DDR pharmaceutical industry. This visit provided an opportunity to experience a system in transition, particularly because the Institutional components of the DDR Academy of Sciences are to be dis-established at the end of December, 1991 and the facilities re-organized and opened in January 1992. The discussions were held with persons who held responsible positions in Administration and Research during the previous 6 year period. The majority of the new Directors and Research Team Leaders have not yet been announced publicly. The report should be understood in this context of transition and uncertainty by the persons interviewed. The purpose of my visit to these centers was to identify areas of strength that may serve as a basis for developing cooperative projects between these research centers and Universities, Federal and Private Sector laboratories in the United States.

The first portion of the report will provide an overview of impressions while the second will describe specific research efforts of each of the laboratories visited.

#### Overview-

1) During the past 12 months the Federal government of Germany, through the Bundesministerium for Research and Technology (BMFT), has provided extensive funds to purchase new equipment for leading research centers in the new Eastern States of Germany. The funding for each of the units approximated 1-2 million DM (equivalent of \$660,000 to 1.4 millions U.S. in Oct 1991). The source of the new equipment was from Germany, the remainder of the European Community, the U.S. and Japan. The funding was also obtained from

the länder (regional States) such as Saxony and Thuringia. The joint funding encouraged investment by the regional authority and increased the visibility of monetary partnerships between State governments in the western states with those in the new eastern states (described in last years report-Kornguth, pg 76 ESNIB of June '91).

2) The new Directors of the Centers will organize the programs to be compatible with research efforts in Western Europe. The missions of the new Centers will be developed from recommendations of the German Science Council and international panels established by the BMFT. The new organization of the Centers permit entrepreneurial activities by members and funding from private sector sources. Teaching approaches will be modified to become consistent with those practiced in the western states of the FRG.

3) Several members of the Institutes, with whom I spoke, had joint activities with the private sector. These joint ventures were at least of 2 years duration and involved corporations such as Eppendorf, Boehringer-Ingelheim and Pharmacia, the research projects involved immobilized enzymes and bioremediation.

4) The younger scientists and several of the established investigators had active programs of interest to the academic and private sectors. These individuals revealed an enthusiasm to participate extensively in joint ventures. Perceived incentives included the opportunity to do significant research with publication opportunities in respected western journals (Nature, Science etc.), availability of research funds and consumable supplies, new equipment, and not least the employment security in a very fluid and uncertain period. The young scientists in the eastern states of Germany are well trained, bright and eager to work; the physical plants and equipment status in the leading laboratories visited are in an improving to good state. At the same time the circumstances appear fluid with regard to employment opportunities in the new unified Germany. This combination of circumstances makes the present time window excellent for new initiatives involving western participation.

5) It appears that many scientists from the eastern German States who recently received, or will receive, a Ph.D. in biochemistry, bioengineering, chemistry are seeking employment opportunities in U.S. or West European laboratories. A large number of highly skilled technical staff are also exploring this possibility. From visits to the identified Centers, from conversations with such students and Faculty at the Biotechnica Fair-Hannover, the numbers of such individuals may well be in the thousands.

6) The emerging European economic community activities (1992) and the North American Free Trade Agreement have generated an abundance of technology brokers. These brokers were present in large numbers

at the Hannover Fair; they were seeking joint linkages between European industry with U.S. based University faculty and small, high technology U.S. industries. Among the materials sought were biological response modifiers, antibodies, high value added chemicals.

#### Research Efforts of Specific Laboratories

A. Central Institute for Molecular Biology at Berlin-Buch. Visited on Friday, Oct 18. My host for the visit was Prof. Dr. H. Bielka. The other persons I met included Prof. Dr. Pasternak and Prof. Dr. Scheller. The new Director of the Center, Dr. Detlev Ganten, Ph.D., MD. has assumed responsibility for the activities at the Center; the mission of the new Center is Molecular Medicine, as defined in the title of the Center (Center for Molecular Medicine). Dr. Ganten had a distinguished career in Heidelberg prior to arriving at CMM.

Prior to the re-organization, the Center had a work force of 1000 and three areas of research: Molecular Genetics, Oncology and Circulation Research. The new Center will comprise a work force of 600 persons.

The Institute had four active areas of interest: monoclonal antibody production at a commercial level; enzyme immobilization for sensor applications; single cell yeast production including fermentation and genetic engineering components; bioremediation.

The monoclonal antibody work involved the group of Dr. Pasternak. He reported that consumers of their antibodies included Pharmacia and Boeringer-Ingelheim. The antibodies available were primarily against tumor cell surface antigens and biological response modifiers (interleukins). The variable fragment of the immunoglobulin ( $F_{ab}$ ) is of mouse origin and the constant fragment of human origin. Their interleukin studies are a continuing joint effort with the Institute of Molecular Genetics in Prague, Dr. Pasternaks main interest is leukemia. Dr. Scheller has an active program in the use of immobilized enzymes as sensors. A joint venture with Eppendorf utilizes glucose oxidase as a sensor for blood glucose levels based on redox systems interfaced with electrodes. He is currently exploring the utility of enzyme or antibody based systems for the detection of cocaine and other drugs in serum and urine. Other immunosensors he prepared are sensitive to pollutants and pesticides.

Dr. Bielka has been investigating the molecular mechanisms controlling cellular responses to stress. Among the proteins examined by this group are the 25,000 dalton heat shock protein (a specific member of the heat shock protein family), and a 40,000

dalton protein involved in the regulation of cellular growth. From a search of the amino acid sequences in the EMBO library, with the VAX computer that the Institute had for several years, Dr. Bielka and colleagues concluded that the heat shock protein had homology with alpha crystalline protein. Since data bank searches reveal homology between these proteins and glutathione S transferase (an enzyme involved in biological detoxification mechanisms), it is likely that Dr. Bielka's proteins may exhibit GST activity. Dr. Bielka has also been studying the regulation of P<sub>450</sub>, an enzyme from yeast and human cells involved in detoxification processes.

The facilities and technical capability available at Berlin Buch include monoclonal antibody production, immobilized enzyme technology with redox electrodes, DNA data base analysis, NMR spectroscopy.

The fee for service capabilities may include monoclonal antibody production immobilization of enzymes, design of membranes containing active enzymes. A possible research thrust involving Drs. Bielka, Scheller and Pasternak may pertain to bioremediation. They possess capability in antibody production, immunoelectrode construction, enzyme electrode construction, protein immobilization, and expertise in P<sub>450</sub>, heat shock protein and possibly GST activity. The three proteins have particular relevance in detoxification processes.

Institute for Neurobiology and Brain Research-Magdeburg. Visited on Oct 21. My host at the Institute was Prof. Dr. Matties. Dr. Matties was the founder of this Institute and has retired as the Director during the past summer ('91). This Institute was founded in 1981 as a section of the German Academy of Sciences and the building housing the Institute was completed in 1989. The staff was recruited from the major medical school, located adjacent to the Institute. The Institute was planned for a research staff of 70 persons and now has 50 researchers. There were three specific areas of research in progress at the time of the visit:

- a) Neuronal Plasticity-molecular to psychophysiological aspects
- b) Relation between the Genetic and Acquired Properties of the Central Nervous System- particularly learning and memory
- c) Blood-Brain Barrier-particularly as related to environmental concerns such as lead and aluminum intoxication. The age dependent changes of the blood brain barrier are being examined.

The research teams are organized as follows:

- a) Biochemistry-role of fucosyl containing glycoproteins in memory formation; role of proto-oncogenes (c fos) in memory and long term potentiation (LTP).
- b) Cell Physiology-role of second messengers and protein kinases in

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LTP; role of proteins that function as ion channels in LTP; hippocampus is the brain region examined.

c) Psychophysiology-effects of drugs and allergic status on short and long term memory.

d) Neuropharmacology- role of brain derived materials on rapid eye movement (REM) phases of sleep.

e) Morphology Group- examination of the blood brain barrier with regard to environmental toxins (lead and aluminum).

The investigations of the group with regard to the role of glycoproteins and lipids in memory and LTP are held in high regard by U.S. investigators.

Institute for Plant Research and Genetics-Gatersleben. Our host at this Institute was Prof. Dr. U Wobus. The Institute, located about 5 miles from Quedlinburg, was visited on Oct 21. The Institute was founded in 1943 by Dr. H Stube and moved to the present site in 1944. The primary mission of the Institute was to serve as repository of over 60,000 cereal grains (gene bank for cereals). The Institute also had a mission to examine the health status of industrial workers in the DDR; this was a consequence of the genetics strength of the Institute. The primary component of the screening was examination of cells from subjects to identify chromosomal structural abnormalities. The research program of Dr. Wobus relates to the production of seed storage protein, the primary amino acid sequence of these proteins, and the relation between seed storage production and carbohydrate metabolism in plants. Among the grains investigated are barley and rye. Current funding by the BMFT supports the gene bank activities of the Center. There is a joint project between Gatersleben and Purdue University related to seed storage proteins. The physical plant of the Gatersleben Institute is well maintained and could function as a Research Park with emphasis on plant biotechnology.

University of Leipzig Medical School-Biochemistry Faculty. The Biochemistry group was visited on October 25 and the host was the Department Head, Professor Dr. Hofmann. The major programs that are currently funded as follows:

a) Cellular and Molecular Biology of Connective Tissue. This is an interdisciplinary and interdepartmental training program.

b) Large Scale Purification of Proteins in Two-phase Aqueous Systems Using Dye-Ligands-Dr. Kopperschlager of the Institute discovered the utility of CIBA-chrome like dyes in the purification of proteins with partitioning between aqueous solutions of polyethylene glycol and dextran. He is the Director of this program.

c) The role of Phospho Fructo Kinase in the Regulation of Glycolysis-Directed by Dr. Hofmann and concerned with the molecular basis of enzyme regulation by ATP and pyrophosphate concentration.

d) Development of Liver as related to activity of enzymes in

carbohydrate metabolism.

Connective Tissue Diseases Program Project- The activity is directed by the Dermatology group at Leipzig and is concerned with scleroderma and pemphigus (two autoimmune disorders). The biochemistry group is investigating whether the increased beta galactosidase and cathepsin activity, observed in these patients, is etiologically related to the disorder. The program provides funds for the training of 10-12 research fellows; half of the fellows must be from Centers other than Leipzig. American investigators would be warmly received as participants in this study. Protein Purification Project- J. Kirchberger explained the program to me since Dr. Kopperschlager was attending a Conference at the time of my visit. The young people in this group are well trained, verbal and well acquainted with the literature. The articles are published in well respected peer reviewed journals. The group has studied extensively the utility of triazine dyes and metal chelate affinity partitioning to isolate enzymes in an active form and to determine the structural dynamics of phosphofructokinase and alpha 2 macroglobulin. An excellent review of these investigations was written by G. Kopperschlager and G. Birkenmeier and appears in Bioseparation 1: 235-254 1990.

Phosphofructokinase Program - The projects associated with this program are under the Direction of Drs. Hofmann and Dozent H.J. Boehme. They are investigating the regulatory aspects of PFK from different organisms with regard to ATP and pyrophosphate control. Dr. Boehme had a sabbatical at Albert Einstein Medical School in New York to investigate regulation of PFK. The group is examining the effects of overproducing PFK in yeast or E. Coli on survival of the organisms. The Boehme group, with Dr. E. Schulze, is investigating the potential uses of ligninases in bioremediation. They are also examining the role of glutathione peroxidase in induction of the albino lethal factor (described by Dr. Salome G. Waelsch of Einstein Medical School, NY). The research group believes that abnormal regulation of PFK may play a role in Alzheimer disease and liver disorders.

The BMFT has been very supportive of the instrument acquisition program at Leipzig; approximately 1.5-2 million DM (equivalent of \$1-1.4 million dollars in Oct 1991) were committed to instrumentation upgrade at the Center. The equipment currently available and operational includes: Microprotein sequencer-Applied Biosystems; Oligonucleotide synthesizer-Pharmacia; Polymerase chain reactor-Cetus; DNA sequencer, NMR spectroscopy (Kopperschlager).

The Hofmann Department in Leipzig has close working relations with the Enzymology group in Halle, Directed by Dr. Schellenberger.

The Biotechnology Trade Fair, called Biotechnica 91, was held in Hannover, Germany between Oct 22-24 1991. This is the largest

trade fair for biotechnology equipment and commercialization held on the continent; it also has had an unusually large representation of eastern European scientists and administrators. At the Biotechnica 91, discussions were held with the research and administrative components of FZB (Research Center for Biotechnology-Berlin). The persons involved included Dr. M Leman (Business Director), Dr. H Liebscher (Scientific Director), Dr. Heinz Schmidt (monitoring devices and b. rhodopsin researcher), Dr. U Korn (wood and paper production; bioremediation). The FZB underwent a reduction in force from 490 members in 1989 to 140 members today. Their original mission was to serve the pharmaceutical industry in the DDR. The areas currently investigated include the use of bacterial rhodopsin, in film structures, for memory storage in computer systems and flash protection; chemiluminescence as detection systems for diagnostic kits. Dr. H. Schmidt has responsibility for these two efforts. The bacterial rhodopsin is obtained from the Shemyakin Institute for organic synthesis near Moscow. FZB prepares films containing the b. rhodopsin. Dr. Korn has responsibility for research on ligninases and anthroquinones for removal of lignin in wood (paper processing). His group has developed a method for cross-linking celluloses enzymatically- the resultant material has excellent coating properties and tensile strength for preparing packaging cartons. These materials are biodegradable. Patent protection is being sought for the cross linking process. The FZB is seeking foreign investment and is open to guidance regarding areas to be developed. The scientific insight of those interviewed appears excellent. The facilities and capabilities of the FZB include 3,000 liter single cell fermenters with feedback control features, protein extraction using multiphase systems, cell free protein synthesis, preparation of genetically engineered organisms (insert gene for alpha amylase), enzyme treatment for wood products as described above. Nitrilase chemistry has been investigated in detail (nitrilase catalyzes the conversion of a cyano to carboxyl group). They have an environmental status group working on removal of pollutants from air and water.

At the Hannover Fair I discussed the activities of the Institute of Microbiology and Experimental Therapeutics - Jena, with the marketing director Dr. Horst Wagner. Their activities are concentrated on the development of sensors for biodiagnostics. Capabilities include analysis by electron tunneling, three dimensional molecular modeling, NMR spectroscopy, encapsulation technology. A comprehensive review of the institute in Jena has been published in Bioengineering Forschung + Praxis, December 1990.

#### Summary

- 1) Multiple Centers have expertise and interest in bioremediation technology
- 2) The current Centers, thanks to heavy investment in

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instrumentation by BMFT and the länder, are well equipped to participate in leading edge biotechnology.

3) The number of new Centers and private sector spin-offs are actively seeking economic investment by the U.S. and EC; they are seeking guidance in research priorities

4) There is an exceptionally large number of well-trained recent Ph.D.'s from the eastern states seeking employment and training opportunities in the U.S.



### Chapter 3.3:

#### Environment and Ecology -----

##### 3.3.1. Atmospheric Sciences: -----

Based on information obtained at a visit to the Meteorological Observatory Potsdam in October 1991, the following general and very brief description of research in atmospheric sciences in the former GDR and during the transition can be given, in addition to the descriptions of work done at the two Meteorological Observatories of Potsdam and Lindenberg (see for these #201 and #202 in chapter 7.1, below):

The Meteorological Observatory Wahnsdorf (near Dresden), formerly known for their work on atmospheric optics and atmospheric electricity, will not be accepted by the Deutscher Wetterdienst, but will join the Sachsen (Saxonia) state system for Environmental Protection. Only one of its former five employed meteorologists continues, some of the others or all of them work on soft money now.

The Heinrich-Hertz Institut für Atmosphärenforschung in Berlin-Adlershof (not to be confused with the West-Berlin Heinrich-Hertz Institut für Schwingungs-forschung) concerned with atmospheric and geomagnetism research is disintegrated. Geomagnetism goes to Niemegk (near Potsdam), concerning the fate of the branch stations at Kühlungsborn and at Juliusruhe (on Rügen, north of Saßnitz). The related recommendations of the Wissenschaftsrat and also plans for the incorporation\* into Blue List Institute for Atmospheric Research at the University of Rostock. The Max-Planck Institut für Meteorologie in Hamburg seems to have a patronizing role. The atmospheric chemical department may go to the Fraunhofer Institut für Atmosphärische Umweltforschung in Garmisch-Partenkirchen (Dr. Seiler).

A survey on the situation of atmospheric research at universities gives about the following picture: The only university left which educated meteorologists was the Humboldt-University in East-Berlin.

-- Leipzig, formerly a leading university in meteorological education had been stripped of that role. Some basic research was continued, also in its two existing observatories (on the island of Zingst in the Baltic - coastal meteorology, currents-, and on Collenberg east of Leipzig - ionospheric research, seismics-).

-- Jena with a large tradition (the longest continuing series of meteorological data series were taken there, in the center of town) seems to be in a process of revitalization.

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\*)our document S25-03

-- At the Technical University of Dresden, one professor for meteorology continued.

-- Forest meteorology and agricultural meteorology were served by Müncheberg and Eberswalde for the former and Quedlinburg for the latter.

A special part of our interest might be dedicated to the effort on Klimafolgenforschung, research on the consequences of changes of climate. A Founding Commission exists under Prof. Klaus Hasselmann, the director of the Max-Planck Institut für Meteorologie in Hamburg. Also the planned GeoForschungsZentrum for Potsdam will find our interest; chair of the Founding Commission is Prof. Giese of the Department for Geophysics at the Free University of Berlin, and, with him. Dr. Asch.

### 3.3.2. The Ecological Situation in the Former East-Germany

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The re-unification of Germany suddenly confronted the population - and with it the scientists - with the worst ecological situation in all of Central and Western Europe, with the urgency to apply a huge amount of effort and all modern equipment to improve the situation - and with the fact that they were not well prepared for that. It is true, nearly everybody knew or had the feeling that the situation was bad but it was neither sufficiently recognized by government and press and television in the East, nor in the West. In the East, it was not even politically correct to speak about this or, even less, to study the situation scientifically. A scientist who made ecological assessment his field of research could not hope to advance significantly. The re-unification presented, with the large impact of recognition of the severity of the situation, the chance to re-organize research and thereby also to address scientific research looking at the ecological problems in a truly interdisciplinary way. The fact that many scientists, especially many chemists, could not continue in their work in the same way. They were thus available and ready to switch to newer fields, e.g. in ecology. The difficulty, however, to really begin a significant improvement, obviously has already dampened the original enthusiasm. We did not hear of any immediate and reasonable plan to clear up the remnants from the uranium mining for the U.S.S.R. (the so called "Wismut"); it seems to be necessary to continue exploiting the heavily polluting soft coal ("Braunkohle"), and modern apparatus to use it in an economically better way is expensive and not fully effective. But the problems are on everybody's mind and because they are crying for scientific solutions, they will play an important role in the programs of many institutes. At least we may expect that the concern about these problems taints the scientific activity even if it is not always spelled out in the name of an institute or in official descriptions of its programs.

### Chapter 3.4:

#### Region of East-Berlin

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In the extra-university realm of scientific research in the former German Democratic Republic (GDR=DDR), the institutes under the Academy of Sciences in Berlin constituted the most important series of institutions. In the Eastern part of Berlin (i.e. external to the "Wall"), the Academy itself was located in a traditional building near the "GendarmenMarkt" in the central Berlin district (often called Berlin-Mitte), number 22/23 in the street which now carries again its historic name "Jäger Straße".

Several of the Academy institutes were housed, with their laboratories, close by in Berlin-Mitte, with the addresses of "HausvogteiPlatz" and "Mohren Straße". The subway (U-Bahn) stations *Stadtmitte* and *Hausvogteiplatz* are the closest ones, suburban railroad (S-Bahn) station *Friedrichstraße* (also a station of the main German railroad lines) is about a 15 min walk.

A second cluster of Academy institutes (and their follow-up present institutes) is located in *Berlin-Buch*, a north-eastern suburb to be reached by S-Bahn line S8 to Bernau, a 50 to 60 minutes ride from *Friedrichstraße*.

By far the largest assembly of institutes is that in *Berlin-Adlershof*, a south-eastern suburb with a S-Bahn station of the same name on lines S6, S8, S9 and S10, about 40 minutes from *Friedrichstraße* or about 50 minutes from *Berlin-Buch*. The area of this assembly of former, present, and future institutes comprises about 550 acres (including a former airfield), partly wooded and with a somewhat restricted access to the general public; the offices, study rooms and labs in one- and multi-story buildings, some of which are dilapidated and will be torn down, replaced by modern ones. There are quite ambitious plans to build here a park for science and small industry, even a university campus, in a strategic location between West- and East-Europe, incorporated into the new (old) capital of Germany, Berlin.

In addition to these three clusters (Mitte, Buch, Adlershof), there are research institutions located in other part of East-Berlin, e.g. the Institute for Molecular Pharmacology close to the U-Bahn station *Friedrichsfelde*. The Humboldt-University (Unter den Linden) is not far from the Mitte-cluster.

In contrast, the scientific institutions in West-Berlin (with its two universities) are more widely spread over most of the area from Mitte to the south-western suburbs (e.g. Dahlem). In the "shadow" of Berlin, but politically being in the Land Brandenburg, we find additional scientific institutes in Potsdam (including a

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university), Potsdam-Babelsberg, Teltow, Zeuthen and, in about 100 km due East, in Frankfurt (Oder), where a traditional university is being recalled into life. A new Technical University is placed about 120 km southeast of Berlin in Cottbus.

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## MAIN CHAPTER 4

### NATIONAL RESEARCH LABS AND BLUE LIST INSTITUTES

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Contains:

Chapter 4.1: National Research Labs  
(GroßForschungsEinrichtungen)

Chapter 4.2: Blue-List Institutes  
(Institute der Blauen Liste)

## Chapter 4.1

### NATIONAL RESEARCH LABS (GroßForschungsEinrichtungen)

Refer to Part A of this REPORT, Chapter 4.5.2.3, for general information on these "Large Research Establishments" and its central organization.

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**#002: CENTER FOR MOLECULAR MEDICINE (CMM)**

Centrum für Molekulare Medizin

also known as Max-Delbrück Centrum für Molekulare Medizin (MDC)

Robert-Rössle-Straße 10

D/O-1115 Berlin-Buch

Telephone: +49 (30) 346-2229 or 946-3278

Telefax: +49 (30) 349-4161 or 949-7008

Telex: 011 2625 awmbf dd

Director: Prof.Dr.Detlef Ganten

Admin.Head: Dr.Erwin Jost

Personnel: 475, of which 192 are scientists.

The new institute is founded on the GDR Academy of Sciences Central-Institutes for molecular biology, cancer research and heart- and circulation research (ZIM, ZIK, ZIHK). Berlin-Buch is a northeast suburb of Berlin, to be reached by suburban railroad (S-Bahn).

**#002\*K3JAN92\*** Clinical research to be concerned with the bases of innate or acquired diseases to establish new approaches to their diagnosis, therapy and prevention with the methods of basic research. Modern methods of cell biology facilitates the connection between various groups of disease such as vascular diseases, autoimmune diseases, neurological disorders, chronic infections or cancer. CMM is reaching beyond the individual research of specific areas toward an integrated investigation into basic molecular biological common factors of the different groups to arrive at joint concepts for their diagnosis, therapy, and prevention. This will allow a better diagnosis and treatment of diseases such as cancer and rheumatic illness, diseases of the heart and the circular system. The focus on individual areas is still to be determined. A close collaboration of the different working groups of the basic research and the clinics is intended. Project oriented groups of researchers will replace those institutes and clinics which have been method-oriented. These groups will temporarily cooperate on research projects benefitting from the different methods and critical understanding inherent to the individual disciplines.

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**#002\*02OCT91\*** Visited the Central Institute for Molecular Biology at Berlin-Buch on Friday, 18 October 1991. My host for the visit was Prof. Dr. H. Bielka. The other persons I met included Prof. Dr. Pasternak and Prof. Dr. Scheller. The new Director of the Center, Dr. Detlev Ganten, Ph.D., MD. has assumed responsibility for the activities at the Center; the mission of the new Center is Molecular Medicine, as defined in the title of the Center (Center for Molecular Medicine). Dr. Ganten had a distinguished career in Heidelberg prior to arriving at CMM.

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proteins may exhibit GST activity. Dr. Bielka has also been studying the regulation of P450, an enzyme from yeast and human cells involved in detoxification processes.

The facilities and technical capabilities available at Berlin-Buch include monoclonal antibody production, immobilized enzyme technology with redox electrodes, DNA data base analysis, NMR spectroscopy.

The fee for service capabilities may include monoclonal antibody production immobilization enzymes. A possible research trust involving Dr. Bielka, Scheller and Pasternak may pertain to bioremediation. They possess capability in antibody production, immunoelectrode construction, enzyme electrode construction, protein immobilization, and expertise in P450, heat shock protein and possibly GST activity. The three proteins have particular relevance in detoxification processes.

#002\*M3AUG91\* In Berlin-Buch, a structure is planned to be created which is, so far, unique for the Federal Republic of Germany: Modern clinical research and basic research in collaboration with ("im Verbund mit") the application of molecular-biological, cellular-biological and physiological methods. The close cross-reference ("verknüpfung") of basic research with clinical research will play a central role in this context.

The Robert-Rössle-Klink - until now belonging to the Central Institute for Cancer Research - and the "Hypertonie-Poli-Klinik" of the Central Institute for Heart and Circular Research will be asked to provide about 70 beds for research purposes following the principle of conciliarity. The new Center will have about 350 personnel, and an additional about equal number of soft-money personnel. The funding required is about DM 60 million, of which the land of Berlin will have to contribute about DM 6 million. It will be a "National Research Lab" (eine GroßForschungsEinrichtung).

{end of institute description for #002}.



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**#003 Environmental Research Center Leipzig/Halle, Inc.**  
Umwelt-Forschungs-Zentrum Leipzig/Halle, GmbH (UFZ)  
Permoser Straße 15  
D/O-7050 Leipzig  
(also: Hallesche Straße 44, D/O-4204 Bad Lauchstädt)  
Telephone: +49 (341) 2392-2242 or 2392-2213 or 2392-2242  
Telefax: +49 (341) 2392-2649 or 2392-2649

Scientific Director: Prof.Dr.Peter Fritz  
Administrative Director: Dr.Karl Tichmann  
Personnel: 379, about 100 of which are in the land Sachsen-Anhalt  
The Institute is in a north-east suburb of Leipzig at  
Bundesstraße No.87 Leipzig-Torgau, about 10 car minutes from  
center of town; about 5 km south of autobahn exit "Taucha/Leipzig  
Nordost".

Remark on transition: This new National Research Lab includes  
part of the work and of the staff of the former GDR Academy of  
Sciences' Institute for Bio-Technology in Leipzig (same address).  
Other parts of that former institute are recommended to be  
incorporated into the University of Leipzig. Because much of the  
old expertise will still be alive in the new National Research  
Laboratory (#003), we include here descriptions of the older set-  
up, based on information as it was available in 1991. These  
descriptions will be found below under: (#003\*NJUL91\*) and  
(#003\*Q1DEC91\*).

**#003\*K3JAN92\* Environmental Research Center Leipzig/Halle Inc.**  
Research objectives:

1. Degradation of xenobiotics in the soil, the ground water and the biosphere caused by air, water and waste disposals, occurring in the past, the present and the future.
2. Removal and stationary behavior of toxins.
3. Study of toxins of waste disposals.
4. The effect of xenobiotics on structures and processes of the ecosystems; interpretation of the findings with regard to protection and management of ecosystems.
5. Ecological diagnosis of specific landscapes of a region and their land use potential as a basis for landscape planning and land development.
6. Regeneration of structures and processes in ecosystems as well as specific regions.
7. Evaluation criteria for sanitation and protective measures, comparative studies of burden on the ecosystem.
8. Counselling of sanitation agencies.
9. Environmental hazards and health.

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**#003\*M6AUG92\*** Generation of scientific bases for the understanding of environmental problems of heavily burdened areas; contributions to the development of methods and to generation of theories in economics systems research. Investigation of the capability for, and of the kind and method of regeneration of heavily burdened ecological systems. Generation of information on technical and socio-economic conditions for sanitation. Reformation of long-term utilization of areas which is environment-friendly. Derivation of information on environmental impacts of production processes and of products. Assessment and processing of data and results of measurements and other information in such a way that they are useful as bases for decisions by government and industry/commerce, but also become useful for comparison with similar areas.

The institute has the following departments:

- Applied landscape ecology
- Analysis of ecological systems
- Soil research
- Biocenosis
- Environmental micro biology
- Hydro-geology
- Environmental chemistry
- Ecological toxicology
- Exposition research / epidemiology
- Sanitation research
- Analytics.

Centers of research activities: Obtain knowledge about the present situation and about the consequences of a re-structuring of the ongoing geo-chemical and biological processes within the limits of socio-economical boundaries. Relations between biological cycles and bottom layer. Effects of certain materials or groups of materials on flora and fauna, and of the exposition of humans to certain damaging materials. Investigation of in-situ sanitation potential, in particular in heavily polluted locations. Routine analytics of the total spectrum of environmentally relevant analytical methods of new analytical processes or methods.

**#003\*NJUL91\*(and #4100\*NJUL91\*)** - NSF Europe Report No.32  
July 17, 1991

Institute for Biotechnology  
Leipzig, Germany  
July 9, 1991

This report is one of several pertaining to a visit to Leipzig, Halle and Dresden, Germany July 9-11, 1991. These visits took place with the assistance of the American Embassy, Bonn and the American Consulate-General, Leipzig. Mr. Frank Kinnelly, Science Counsellor in Bonn and/or Mr. Nicholas Dean, Vice Consul in Leipzig, were co-participants in the meetings and provided

important background information and logistical support. Except where otherwise indicated, the opinions expressed are those of the persons visited - as understood by the drafter.

The Institute for Biotechnology is directed by Prof. Dr. Wolfgang Babel, and he is assisted by Prof. Dr. Hans-Dieter Phland. The institute has 420 employees, of whom 190 are scientists. Its work is focussed on environmental biotechnology, geobiotechnology, microbial syntheses and bioengineering. There are about 1,500 researchers in the Leipzig area who are engaged in research related to environmental problems. - at the Institute of Geocology, the Institute of Biotechnology, and the Isotope Institute. There are also researchers in Halle, Bitterfeld and elsewhere who were previously in industry but who are now unemployed. Many of these people could participate in the research that will be required to address environmental problems in Germany. Certainly 50% of them are able to do first-class, nontrivial, work. What is required, however, is more than diagnosis and therapy - "prophylaxis" research is also necessary. Procedures and techniques must be developed to avoid contamination in the first place but few researchers are willing to think in that way.

The Wissenschaftsrat (Science Council) has evaluated this institute as it has all institute of the former Academy of Sciences of the German Democratic Republic (DDR). Among its recommendations have been that 30 scientists and technicians should go to work in the universities, and that 30 more should work in the environmental area [in a new institute for the environment which is to be formed in the Leipzig-Halle area- our number #003]. A few more researchers will be able to obtain jobs overseas. The University of Leipzig has work underway in the biosciences but not in biotechnology. Perhaps a new institute of biotechnology will be set up at the university. Of the 15-20 biochemistry students who are enrolled each year at the university, four or five come to the Institute for Biotechnology. Researchers from the institute go out to the universities in Dresden, Leipzig and Halle to teach.

The institute has several lines of research which may be of more than routine interest for researchers in other institutes, including those in the United States.

- Geobiotechnology work, especially concepts for the management of metal-related pollution. Techniques for the sorption, solution and collection of metals.
- Genetic manipulation in biotechnology-relevant organisms such as Acetobacter.
- Understanding of processes, including selection of organism, determination of characteristics, optimization, modelling of process, scale-up.

- Auxiliary substrates. A method for clarification and optimization of practical applications.; Heterotrophic substrates, and mixing of substrates with different energy ratios. The upper limit of C conversion will determine the limiting reaction in a long sequence.
- Bioengineering, scaling up processes with economic evaluation. Forming recommendations to microbiologists for the development of organisms with desired features.

The institute has a pilot-plant scale fermenter/production facility, with a high O<sub>2</sub>, 200 liter fermenter and several smaller units. This facility is employed in the production of cellulases, degradable polyesters, organic acids (gluconic acid from glucose). Work is also underway on thermophylic organisms (78 degrees C) for the production of thermostable enzymes used in esterification, as is enzyme regulation and metabolism research. Biosensors work includes enzyme detectors of glucose, sucrose, phenols and nitrates which have been developed and developmental work on an ammonia sensor. [The Appendix lists the lines of research underway at the institute in detail.]

**NSF/EUROPE Comment:** Like its neighbor the Radiation/Isotopes Institute, with which it shares space on this campus, the Biotechnology Research Institute has been focussed on practical applications and helping industry. Some aspects of its work however, have been directed to theoretical and experimental studies on basic mechanisms related to limits, efficiency and performance of organisms of potential importance in biotechnology.

Appendix to NSF Report 32

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Institute of Biotechnology Leipzig  
Permoserstraße 15  
0-7050 Leipzig, Federal Republic of Germany  
Director: Prof. Dr. Wolfgang Babel

The Institute of Biotechnology was founded in 1969 with the main task to develop fundamentals and technical processes for single cell protein production in large scale. Based on the resulting knowledge of mass cultivation of microorganisms research and development have been extended to recently four main fields:

- Environmental Biotechnology
- Geobiotechnology
- Microbial Syntheses
- Bioengineering

The structure of the Institute of Biotechnology corresponds with these research fields completed by mainly methodologically working centers:

- Center of Microbiology
- Center of Bioanalytics

#### Environmental Biotechnology

Research and development in environmental biotechnology have been focused on

- Degradation of xenobiotics in aquatic and terrestrial ecosystems: Fundamental investigations of influence of xenobiotics on ecosystems, relations between chemical structures and persistence or degradability as well as mechanisms of degradation; development of technical solutions for degradation and detoxification processes
- Structure and dynamics of microbial biocenoses in technical and natural ecosystems, especially in regard to the estimation of risks connected with the employment of microorganisms in large scale

Following special problems have been intensively investigated:

- Degradation of methylated phenols and polyphenols from thermal coal processing by adapted mesophilic and thermophilic anaerobic biocenoses
- Influence of short-time changes between aerobic and anaerobic conditions on the efficiency of the aerobic degradation of organic highly loaded waste waters
- Degradation of xenobiotics in nitrification and denitrification processes
- Decontamination of soils loaded with explosives by microorganisms selected from such biotopes
- Degradation and detoxification of persistent xenobiotica by especially selected and optimized thermophilic and oleophilic strains
- Homogeneity and stability of technically applied biocenoses

#### Geobiotechnology

Geobiotechnology deals with the application of microorganisms and/or their metabolites for

- Geobiotechnological mining and processing of ores, minerals and waste products of various industries.
- Metal extraction and recovery from aqueous solutions by means of biosorption and bioaccumulation techniques with view to environment protection
- Biological desulfurization and degradation of coal.

Since 1980 the following special research objectives have been studied:

- Heterotrophic and chemolithoautotrophic leaching of metals (U, Cu, Ni, Mo, REE) from ores, minerals and wastes or in-

**intermediate industrial products:**

Basic research with regard to increase the leaching efficiency: kinetic studies of leaching processes, physiological characterization and optimization of the growth conditions of leaching active microorganisms

- Looking for possibilities of inhibition of uncontrolled leaching processes and microbial activities in non-operating leaching dumps and low-grade ore deposits
- Problems of bio-dressing and microbial flotation, removal of iron from sands, kaolins and clays, microbial silicate destruction and utilization
- Studies of microbial corrosion problems
- Investigation of the interaction between microbial structures and metal ions:

Basic research of the biosorption, bioaccumulation and metal desorption mechanisms

Influence and increase of the sorption kinetic and metal uptake capacity by means of mechanical, chemical or physiological procedures or physiological manipulations

- Isolation of new microorganisms active in leaching and accumulation of metals, studies of microbial communities and their role in geochemical processes occurring in linear deposits and weathering crusts
- Studies of bioconversion of sulfur compounds especially such as can be found in coal and possibilities for liquefaction of coal structures.

**Microbial Syntheses**

Research in the field of microbial product syntheses have been directed to investigations of their scientific fundamentals as well as to the development of technical principles and procedures:

- Scientific basic research:
  - \* Theoretical and experimental determination of the microbial performance potential and its limits
  - \* Exploration of physiological-biochemical principles determining the efficiency of microbial growth and product formation (e.g. "overflow metabolism") and derivation of possibilities of phenotypical improvement of microbial performances (optimization of fermentation conditions, auxiliary substrate concept etc.).
  - \* Genotypical optimization (by mutagenesis or proto-plast fusion) and construction (by genetic engineering) of qualitatively or quantitatively improved potential production strains
- Methodological developments in fermentation processes (e.g. solid state fermentation, employment of immobilized cells and enzymes)
- Development of technical procedures for the production of definite metabolites and enzymes, preferably for the chemi-

cal and pharmaceutical industry.

Examples for technological principles and procedures developed:

- Production of small molecules, especially organic acids (citric, gluconic, ketoglutaric, itaconic, oxogluconic, acid; lactic acid, especially stereoisomeric lactic compounds as constituents of herbicides and pesticides)
- Production of high-molecular biopolymers (Poly- $\beta$ -hydroxybutyric acid - basically from glucose but also from methanol and methane -, xanthan, dextran, bacterial cellulose)
- Production of enzymes (cellulase, lipase, ligninase) for various applications in chemical and food industry and also for environmental protection.

#### Bioengineering

Research and development in bioengineering have been established with the main task to support the basic research groups in scaling up of their results for industrial application by:

- Optimal designing of biological and technical systems at all stages of a biotechnological process
- Optimization of process regimes including automation concepts, adaptation of control theories to specific demands of biotechnological processes
- Economic evaluation of biotechnological systems and processes by combined use of economic and ecological parameters as decision criteria, preferably on the basis of models.

Special techniques and methods have been developed, modified and introduced into the biotechnological practice:

- Continuous aerobic high performance fermentation especially by using system pressure for increasing gas (especially oxygen) transfer rates and experimental modelling for distinct and coupled processing steps
- Separating of multiphase system coupled with recycling steps
- Electrokinetic methods, like high pressure extraction, preparative HPLC, polymeric phase-distribution, and the chromatography with rotation counter-current
- Development and employment of biosensors for process control

#### Center of Microbiology

- Culture collection (nearly 700 mainly technologically relevant strains of yeasts, other fungi, bacteria and bacteriophages)
- Taxonomy and diagnostics of yeasts and selected groups of aerobic bacteria
- Electron microscopy
- Microbiological process monitoring

#### Center of Bioanalytics

- Analytical characterization of biotechnological processes and products by high performance liquid chromatography, mass

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- spectrometry, molecular spectroscopy; trace elements determination by atomic absorption spectrometry.
- Characterization and identification of microorganisms by gas chromatography and Fourier transform infrared and fluorescence spectroscopy.

(end of NSF Report No.32 and its appendix)

**#003\*Q1DEC91\* Information about the Institute of Biotechnology Leipzig**

**1. General Survey**

- 1.1. Address, Telephone, etc. - see above
- 1.2. Setting, Environment, Access: - see above

**1.3. Organization, Structure, Hierarchy**

The Institute of Biotechnology Leipzig belonged to the former Academy of Sciences of the GDR; at the moment (up to 31 December 1991, date of the definitive closing of the institute) it is directly assigned to the Ministry of Science and Art (Ministerium für Wissenschaft und Kunst) of the Free State of Saxony. The Institute of Biotechnology is subdivided into four scientific sections (each consisting of a different number of departments), two methodological centers and some administrative structure units.

**1.4. Employees**

At present approximately 430 employees belong to the institute (about 200 scientists, 200 technicians and 30 members of the support staff). Because the institute will be closed at the end of this year and will not be continued in 1992, the questions about the number of regular coworkers and "soft money" fellow workers to be expected for 1992 cannot be answered.

**1.5. Institute Publications, Host Conferences**

- The Institute of Biotechnology edits (edited) its own scientific journal, the "Acta Biotechnologica", which is indexed or abstracted in Current Contents/ET & AT; Chemical Abstracts; Biological Abstracts; Biotechnology Abstracts, and Excerpta Medica.
- The institute regularly (every two years) organized international scientific conferences, the "Leipzig Symposia of Biotechnology" (in cooperation with the Leipzig University).



## 2. History of the Institute

### 2.1. Long-Term History, Foundation of the Institute, Tradition

The Institute of Biotechnology was founded in 1969 with the main task to develop fundamentals and technical processes for single cell protein production in large scale.

### 2.2. Recent History

See point 4

## 3. Research

### 3.1. Scientific areas covered:

Environmental Biotechnology  
with the topics:

- Degradation of xenobiotics in aquatic and terrestrial ecosystems: Fundamental investigations of influence of xenobiotics on ecosystems, relations between chemical structures and persistence or degradability as well as mechanisms of degradation; development of technical solutions for degradation and detoxification processes
- Structure and dynamics of microbial biocenoses in technical and natural ecosystems, especially in regard to the estimation of risks connected with the employment of microorganisms in large scale

Geobiotechnology  
with the topics:

- Geobiotechnological mining and processing of ores, minerals and waste products of various industries
- Metal extraction and recovery from aqueous solutions by means of biosorption and bioaccumulation techniques with view to environment protection
- Biological desulfurization and degradation of coal

Microbial syntheses  
with the topics:

- Scientific basic research:
  - \* Theoretical and experimental determination of the microbial performance potential and its limits concerning velocity and efficiency
  - \* Exploration of physiological-biochemical principles determining the efficiency of microbial growth and product formation (e. g. "overflow metabolism") and derivation of possibilities of phenotypical improvement of microbial performances (optimization of fermentation conditions, auxiliary substrate concept etc.).

- \* Genotypical optimization (by mutagenesis or protoplast fusion) and construction (by genetic engineering) of qualitatively improved potential production strains
- Methodological developments in fermentation processes (e. g. solid state fermentation, employment of immobilized cells and enzymes)
- Development of technical procedures for the production of definite metabolites and enzymes, preferably for the chemical and pharmaceutical industry

Bioengineering  
with the topics:

- Optimal designing of biological and technical systems at all stages of a biotechnological process
- Optimization of process regimes including automation concepts, adaptation of control theories to specific demands of biotechnological processes
- Economic evaluation of biotechnological systems and processes by combined use of economic and ecological parameters as decision criteria, preferably on the basis of models

Methodological research and development have been focused on microbiological and analytical problems:

- Culture collection (nearly 700 mainly technologically relevant strains of yeasts, other fungi, bacteria and bacteriophages)
  - \* Taxonomy and diagnostics of yeasts and selected groups of aerobic bacteria, especially identification and differentiation of strains, mutants and rDNA-organisms
  - \* Microbiological process monitoring
- Analytical characterization of biotechnological processes and products by high performance liquid chromatography, mass spectrometry, molecular spectroscopy; trace elements determination by atomic absorption spectrometry

3.2. Specific scientific activities

In the field of Environmental Biotechnology:

- Degradation of methylated phenols and polyphenols from thermal coal processing by adapted mesophilic and thermophilic anaerobic biocenoses
- Influence of short-time changes between aerobic and anaerobic conditions on the efficiency of the aerobic degradation of organic highly loaded waste waters
- Degradation of xenobiotics in nitrification and denitrification processes

- Decontamination of soils loaded with explosives by microorganisms selected from such biotopes
- Degradation and detoxification of persistent xenobiotics by especially selected and optimized thermophilic and oleophilic strains
- Homogeneity and stability of technically applied biocenoses.

In the field of geobiotechnology:

- Heterotrophic and chemolithoautotrophic leaching of metals (U, Cu, Ni, Mo, REE) from ores, minerals and wastes or intermediate industrial products. Basic research with regard to increase the leaching efficiency: kinetic studies of leaching processes, physiological characterization and optimization of the growth conditions of leaching active microorganisms
- Looking for possibilities of inhibition of uncontrolled leaching processes and microbial activities in non-operating leaching dumps and low-grade ore deposits
- Problems of bio-dressing and microbial flotation, removal of iron from sands, kaolins and clays, microbial silicate destruction and utilization
- Studies of microbial corrosion problems
- Investigation of the interaction between microbial structures and metal ions: Basic research of the biosorption, bioaccumulation and metal desorption mechanisms; Influence and increase of the sorption kinetics and metal uptake capacity by means of mechanical, chemical or physical procedures or physiological manipulations
- Isolation of new microorganisms active in leaching and accumulation of metals, studies of microbial communities and their role in geochemical processes occurring in mineral deposits and weathering crusts
- Studies of bioconversion of sulfur compounds especially such as can be found in coal and possibilities for liquefaction of coal structures

In the field of microbial syntheses (Development of technological principles and procedures for):

- Production of small molecules, especially organic acids (citric, gluconic, ketoglutaric, itaconic, oxogluconic acid; lactic acid, especially stereoisomeric lactic compounds as constituents of herbicides and pesticides)
- Production of high-molecular biopolymers (poly- $\beta$ -hydroxybutyric acid - basically from glucose but also from methanol and methane -, xanthan, dextran, bacterial cellulose)
- Production of enzymes (cellulase, lipase, ligninase) for various applications in chemical and food industry

and also for environmental protection.

In the field of bioengineering

- Continuous aerobic high performance fermentation especially by using system pressure for increasing gas (especially oxygen) transfer rates and experimental modelling for distinct and coupled processing steps
- Separating of multiphase systems coupled with recycling steps
- Electrokinetic methods, like high pressure extraction, preparative HPLC, polymeric phase-distribution, and the chromatography with rotation counter-current
- Development and employment of biosensors for process control.

3.3. Problems being worked on after 01 January 1992:

According to the appointments of the German Unification Treaty the Institute of Biotechnology will be closed at 31 December 1991 without any succession institutions. Therefore, all the research directions listed above under 3.1. and 3.2. cannot be continued and, also for this reason, new scientific areas for 1992 cannot be listed (see also point 4).

3.4. Future scientific problems envisioned: see 3.3. and 4.

4. German Unification, Transition:

4.1. Wissenschaftsrat (Science Council):

The Institute of Biotechnology was evaluated by the Science Council in the first half-year 1991 with following results:

- The institute cannot survive in its present size and structure
- Parts of the scientific potential working in the fields Environmental Biotechnology and Geobiotechnology, respectively, should be transferred into the newly founded Environmental Research Center Leipzig/Halle
- The departments of biochemistry, genetics, biosignals and microbiology are recommended to be integrated into Leipzig University (with reduced number of staff).

The realization of these recommendations, especially the proposed integration of some research fields into other institutions is still completely uncertain.

4.2. Special problems of administrative character:

The Institute of Biotechnology was very involved in industrial problems and developments and, therefore, very limited in regard of the exchange of scientific data (especially restrictions for publication of own scientific results), travels to the west and, finally, in the choice of its scientific

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program. The equipment with scientific instruments, computers and scientific literature did not correspond with international standards. In 1990, especially in 1991, these situations could be significantly improved by sponsoring the research work by the Ministry of Research and Technology of the FRG and the German Research Society (Deutsche Forschungsgemeinschaft, DFG, the German NSF).

#### 4.3. International Contacts:

Caused by the general situation of a scientific institute in the former GDR and, additionally, by the close connection between the institute and the chemical industry, the opportunities of international contacts were very limited for the majority of scientists. On the other hand the Institute of Biotechnology had multifarious relationships to many scientific institutions in the Soviet Union, but also in other formerly socialist countries (CSFR, Hungary) which will be finished together with closing of the institute at the end of the year 1991.

4.4. Scientific problems to be abandoned after 01 January 1992:  
See 3.3.

#### 4.5. Released scientists:

The real percentage of scientists losing their job after closing the institute cannot be estimated at present. Basically the majority of the scientists (about 80%) of the institute is endangered to be unemployed in 1992. According to the recommendations of the Scientific council (see 4.1.) approximately 30-40 coworkers of the institute could be integrated into the University or the Environmental Research Center. There is a very real danger of loss of scientific capacity due to the migration of scientists to foreign professions.

{end of institute description for #003}

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**#004 Research Center Berlin-Adlershof of the DLR (German Aerospace Research Establishment), including the Satellite Ground Station Neustrelitz (in the land Mecklenburg-Vorpommern)**

Forschungs-Zentrum Berlin-Adlershof der DLR, einschließlich  
Satelliten-Boden-Station Neustrelitz  
Rudower Chaussee 5  
D/O-1199 Berlin  
Telephone: +49 (30) 6704-3481 or 6704-2681 or 6704-5768  
Telefax: +49 (30) 22-59-27 (uncertain)

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for Satellite Station:  
Kalhorstweg  
D/O-2080 Neustrelitz  
Telephone: +49 (3981) 7481  
Telefax: +49 (3981) 7485  
Director (acting): Dr. Wolfgang Keydel  
Admin.Head: Herr Salvini-Plawen

Remark: These two new facilities (or one facility and a sub-facility) of the National Research Lab called Deutsche Forschungs-Anstalt für Luft- und Raumfahrt, DLR (German Aerospace Research Establishment) is a follow-on institute of the former Institute für Kosmosforschung, IKF (Institute for Cosmos Research) of the GDR Academy of Sciences, which developed out of the "Institut für Elektronik (1973-1981)". In fact, in taking over this institute, DLR returned to the locality of the birth of its predecessor which was founded in Berlin-Adlershof. One of the most interesting activities of the IKF was the invention, design, development, construction and space-testing of instruments for USSR Satellites - and earlier than most or all other East-German institutes, this one was able to take up again its contacts with Russia, leading to similar future tasks for collaboration with Russian space research now undertaken by DLR, e.g., for a flight to Mars. The difficult transition task was guided by Dr. Wolfgang Keydel, the Director of the Institute for High-Frequency Research of the DLR at Oberpfaffenhofen near München (Munich).

#004\*K3JAN92\* Research Center Berlin-Adlershof of the DLR including Satellite Ground Station Neustrelitz (DLR = German Aerospace Research Establishment)

Research objectives:

1. Planetary remote sensing.
2. Satellite investigations, Hydrosphere.
3. Sophisticated remote sensing systems (sensor development, mission techniques, qualification and quality control);
4. Regional user centers for remote sensing data (Satellite ground station Neustrelitz)

#004\*2OCT92\* The following information was extracted by the author of this REPORT from material provided by the Gründungs-Direktor (Foundation Director) Dr. Wolfgang Keydel. This is the most recent and complete description of #004 but neglects the history and the larger scope which will be provided below under (#004\*EJUL91\*) as submitted one year earlier by the American Embassy in Bonn.

The former Institut für Kosmosforschung, IKF (not considering here the branch in Neustrelitz) is followed by two new institutes under the DLR (which for the purpose of this report are both described under the number #004):

#004a: Institut für Planeten-Erkundung (Institute for the Investigation of the Planets)

#004b: Institut für Weltraum-Sensorik (Institute for the Development of Sensors for Space),

which, together with the station in Neustrelitz compose the

#004: Forschungs-Zentrum Berlin-Adlershof der DLR (Research Center Berlin-Adlershof of the German Aerospace Research Establishment).

The #004a Institut für Planeten-Erkundung has the task to investigate bodies in our solar system, in particular, planets, by means of remote sensing, i.e., by space experiments, labor investigation, and theoretical modeling. The institute has three departments with following tasks:

- The Department for Planetary Research conducts experimental and model investigation of the physics and geology of planets and smaller bodies including meteorites. The forms and surface morphologies and the atmospheres are to be determined, using comparative planetology.

- The Department for Space Missions is preparing and implementing scientific experiments and planetary missions using remote sensing and in-situ measurements, including relevant data technology, mission simulation and development of marginal specifications.

- The Department for Experimental Preparation of Missions conducts experiments on Earth or in the lab to detect and identify spectrometric, geometric and radiometric signatures and determines the scientific evaluation of these signatures to arrive at a correct interpretation of the physical and chemical properties of the bodies to be investigated; and strives toward the experimental verification of sensor parameters with regard to certain defined functions.

The Institute (in part incorporating facilities available in the DLR Institutes in Oberpfaffenhofen near München) aims at the following goals, established for the 1994 mission to planet Mars:

- three-dimensional assessment and presentation of the surface of Mars,
- morphological investigation of selected areas spatial resolution,
- investigation of the structure and evolution of the crust and upper mantle of Mars,
- multispectral classification for estimations on the chemical and mineralogical composition,
- observation of large-scale events in the atmosphere and on the surface over long time periods,

- investigation of climatic, meteorologic and aeolic phenomena,
- interaction of atmosphere and surface.

In addition, the following tasks for Mission Mars-94 are to be pursued:

- o Management of the experiments and support of the users,
- o Establishment and operation of the scientific data system,
- o Planning of the Mission and implementation of the experimental operations,
- o Calibration of instruments

The international cooperation extends to the USA, Japan and Russia and other Eastern states.

The #004b Institut für Weltraum-Sensorik has the task to develop and to utilize passive sensor systems for the remote sensing of the Earth in the optical part of the em-spectrum for platforms in space. Artificial Intelligence is one important tool for the in-situ reduction of the stream of data, for the automatization of data processing and for provision of real-time information. The Institute has five departments with the following tasks:

- The Department for Processing of Sensor Signals  
Application of artificial intelligence for the processing of expert-systems, adaptive and capable of learning sensor system for the solution of remote-sensing problems, involving optimum geometric, radiometric, and spectral measuring accuracy. Development of efficient (in particular real time) algorithms for space and ground usage, based on models and simulations of remote sensing systems, and on modern methods of signal- and systems-theories. Investigations of the possibilities of optimum remote sensors on space vehicles, e.g., considering results of bionics.
- The Department "Intelligent Sensorics" conducts research in the areas of intelligent analog and digital sensor electronics, in particular for CCD-sensors. Development of innovative systems components (hard- and software) for adaptive and capable of learning control units to promote automatization; for algorithm-oriented special processors aiming at data compression as well as at optimization of selection, compression and evaluation of information.
- The Department for the construction and calibration of space sensors develops and constructs opto-mechanical components of remote-sensing sensors for the purposes of environmental and planetary investigation. Generation of concepts of instrumental techniques and of functional requirements of intelligent sensors or spectrometers. Development of, and making available methods and means for the calibration (geometrically, radiometrically



and spectrally) and the evaluation of optoelectronic sensors, inclusively spectrometers.

- The Department for the Conditioning of Systems develops, supervises and applies testing methods and testing instruments for the qualification and probing of thermic and mechanic sensor characteristics under complex environmental conditions. Development of testing philosophies relevant for the projects and of methodologies for the functional testing of payloads, modelling and experimental testing of the thermal conditioning of space vehicles. Developing concepts for, and developing techniques of scientific instruments and of soft- and hardware components of optoelectronic measuring instruments. Development of technology and preparation of innovative solutions for problems of payloads (e.g. development of new construction materials for space vehicles), and determining their qualification with regard to: mechanical and dynamical strength, degradation, contamination, resistance for complex radiation, reaction to high vacuum and thermal vacuum. Investigation of procedures and methods for the improvement of space sensors, of possibilities to minimize the necessity of instrumentation, and to an estimation of redundancy of systems.

- The Department for the Utilization and Application of Intelligent Sensor Systems investigates the utilization of space data in order to generate measuring methods for data processing to interpret effects of civilization on "System Earth" (waste products, traditional burden cases, town ecologies, sea surface, etc.) and for surveillance tasks with a preventive character in the civilian sector. Continuing development of methods for the correction of atmospheric effects in the multispectral optical remote sensing data. Enhancement and further generation of concepts for verification, global models and of algorithms for simulation. Acceptance of the functions of Principal Investigator and of Co-PI for Earth-investigation experiments. Generation of inter-disciplinary global models and of an inter-disciplinary data bank for the assessment of global relations.

The Institut für Weltraum-Sensorik (Institute for the Development of Sensors for Space) plans to conduct the following tasks:

- Construction and development of the WAOSS camera for the Mars mission 1994:
  - \* Design and realization of WAOSS camera, inclusive construction of the flight- and ground-models;
  - \* Implementation of airborne preliminary experiments;
  - \* Calibration of instrument;
  - \* Development and construction of the electronics and of the relevant software for flight models;
  - \* Qualification,, verification and testing of WAOSS camera;

- \* Development of special methods for the on-board and ground processing of WAOSS data, algorithms for automatization.
- Development of the multispectral optical scanner MOS for the Russian PRIRODA mission:
  - \* Design and realization of the MOS instrument, construction of the flight- and ground units;
  - \* Calibration of the sensor unit;
  - \* Development and construction of the electronics including relevant software, and of data processing;
  - \* Qualification, verification and testing;
  - \* Scientific evaluation of the MOS data.
- Construction, preparation, development of the thermal concept thermal design, determination of qualification, and of data processing for the Dust Sensor for the CASSINI mission:
  - \* Development of the procedure for data compression;
  - \* Thermal-concept, thermal design, qualification, verification, testing;
  - \* Development of technology, construction of a "Cosmic Dust Analyzer (CDSA)".

The institute possesses, among others, the following facilities:

- clean rooms
- facilities for calibration of radiation measurements in the VIS/NIR ranges;
- monochromators for spectral measurements;
- thermal-vacuum-simulations and testing facilities;
- climate simulation technology;
- mechanical-dynamical testing facilities;
- complex radiations generation and test facilities (VUV, VIS, IR-protons, electrons, at the same time to the same target) - planned;
- CCD detector measuring station.

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#004\*EJUL91\* The Cosmos Research Institute and its Future as part of the German Aerospace Research Establishment:

1. Summary: The supervisory board (Senate) of the German Aerospace Research Establishment (DLR) has approved the establishment of a new DLR center in Berlin which will concentrate its efforts on the former GDR IKF (Institut für Kosmosforschung) inter cosmos programs. This decision was reached after the German Science Council (Wissenschaftsrat) recommended that IKF continue to operate without major functional changes. The Institute won praise for its employees, its facilities, and its past work with the Soviet Space Program. End Summary.

2. The Senate, DLR's highest decision making body, meets twice a year and is headed by research ministry (BMFT) State Secretary Neumann. Members of the Senate include representatives from ministries such as Finance and Transportation, as well as members from Industry, Universities, and Federal Länder. The main tasks of the Senate are to decide on personnel management, DLR Research Programs, and Financial activities.

3. At its 21 June 1990 meeting, the Senate approved recommendations by DLR Management to establish a DLR center in Berlin which will concentrate on activities of the former GDR Institut für Kosmosforschung (IKF). The center will include two institutes in Berlin and a ground station in Neustrelitz, which will be incorporated into DLR at a later date. Although exact tasks are still to be defined, the center will probably concentrate on IKF's inter cosmos programs including imaging instrumentation and planetary science. The new center would also continue to undertake management tasks for the BMFT in terrestrial communications research. Since the Finance Ministry has already given the green light to start contracting, operation of the center is scheduled to start on January 1, 1992.

4. In an evaluation of IKF prepared by the German Science Council (Wissenschaftsrat), the IKF is described as an institute with considerable experience in remote planetary exploration. This experience was gained through participation in Soviet Space missions and its expertise developed in the design and manufacture of related equipment and measurement techniques. According to the Science Council, these activities were cited as justification for the continuation of selected aspects of IKF's programs. In the Science Council's opinion, general scientific interest as well as obligations to ongoing Soviet Space Projects argue convincingly for IKF's continued existence. These two factors suggest a future for the institute in the area of planetary remote sensing -- an area where former West Germany was relatively weak. (Comment: As in its evaluations of other institutes of the former GDR Academy of Science, the Science Council was careful not to recommend wholesale continuation of the IKF in its current form or retention of all personnel associated with it. Only "qualified" employees are to stay on. The criteria constituting "qualified" employees have yet to be determined. End Comment)

5. The Science Council also recommended the establishment of a planetary remote sensing institute of DLR in Berlin-Adlershof. During the transition phase from IKF's present status until full integration into the German Space Infrastructure, IKF's activities which duplicate those of DLR are recommended to be eliminated. The Science Council recommended that research projects planned by IKF in the areas of extraterrestrial

astronomy and cosmic plasma physics should be continued under the umbrella of Max Plank Work Groups in a neighboring University, and in close coordination with DLR. Additionally, it is recommended that DLR assume responsibility for the Neustrelitz Satellite Ground Station, which may evolve into a regional remote sensing facility and eventually into a user data center as well. Neustrelitz's present function as a ground station for Soviet Satellites is expiring as a consequence of German unification.

6. The Institut für Kosmosforschung (IKF) was founded in 1967 (under another name, changed to the present formulation in 1981), as an institute of the GDR Academy of Sciences. The Institute Director is Prof. Dr. H. John. The Institute has over 330 people - 280 in Berlin and 54 at the tracking station at Neustrelitz. This number will go down to 140-150 in the new institute. The people who will not continue will go the private sector, some to DARA in Bonn and some to DLR. Not all employees will be able to continue their research work.

7. In the past, the Institute's work has centered on support for several aspects of the Soviet Space Program. The Institute currently looks forward to developing contacts with the U.S. It has developed a variety of Remote Sensing and other on-board electronics packages for the Salyut and MIR Stations and for various satellites. The institute will retain some of its responsibilities for coordination of space research with the Soviet Union, as part of its DARA work. The institute has specific research programs in the following areas:

- Remote Sensing Spectrometry: In the visible/near infra-red region. Helping to determine composition of marine environments.
- Optoelectronic Systems: Wide-angle optoelectronic scanner being developed for the Mars 94 project. Three CCD lines for stereo reconstruction of the Mars surface data.
- Extraterrestrial Physics: Including planetary surfaces, comets, plasma physics, magnetometry, extraterrestrial astronomy (Gamma/Roentgen X-Ray telescope projects).
- Technical Support: Space simulation chambers to test equipment against conditions of temperature and radiation encountered in space.

8. The Institute also has a computer center with a Vax 7085 computer obtained prior to the unification of Germany. A new vacuum chamber for solar testing is being installed. The 1 meter X 3 meter facility was produced by Zeiss, Jena.

9. IKF is currently divided into five substantive bureaucratic sub units:

- Department 4, responsible for overseeing and maintaining the satellite groundstation at Neustrelitz;

- Department 5, the department of optical remote sensing;
- Department 6, responsible for the design and manufacture of optoelectric systems;
- Department 8, extraterrestrial physics; and
- Department 9, the engineering department for development and testing of space research equipment.

10. The above organizational structure will be retained until 31 December 1991 at which time, according to our contacts at DLR, IKF will be broken up and formally absorbed into the West German Space infrastructure. By this time, DLR's Senate decided to create 140 to 150 new positions for its new center in Berlin, which implies cutting in half the present IKF staff of 300 (which is already down from 400).

11. Since the IKF's establishment in the late 1960's roughly coincident with the establishment of the Soviet Bloc Intercosmos organization, IKF has contributed 160 on-board instruments and 2 ground station complexes to 73 space missions. Some of the IKF's achievements over this period include:

- Development of research instruments and programs in the field of remote sensing materials science and space medicine in connection with the USSR/GDR joint manned space flight in 1978.
- Development and construction of infrared-fourierspectrometers for 3 Soviet meteor satellites for continuous measurements of the temperature profile in the earth's atmosphere. Techniques developed at IKF were refined and used in the investigation of Venus' upper atmosphere aboard the Soviet deep space probes Venera 15 and 16.
- Design and production of the multispectral instrumentation complex MKS-M with high spectral resolution and radiometric accuracy for long time use aboard Salyut and MIR.
- Construction of ground receiving station for orbiting and geostationary meteorological satellites.
- Development of a precise optoelectronic complex for the automatic astro-orientation of spacecraft and payloads.
- Scientific interpretation of the images of Halley's comet as participant in the Soviet Vega project using in-house image processing techniques. New scientific data were retrieved concerning the plasma and dust environment of the comet's nucleus.

{end of description of #004}

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#005/01 - #006/01  
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**#005: Research Center for Innovative Computer Systems and Computer Technology ("FIRST") of the "Society for Mathematics and Data Analysis"(GMD)**

ForschungsZentrum für Innovative Rechnersysteme und -technologie (FIRST) der "Gesellschaft für Mathematik und Datenverarbeitung" Rudower Chaussee 5, Haus 13.7  
D/O-1199 Berlin 12

Telephone: +49 (30) 6704-5957

Telefax: +49 (30) 6704-5088

Director of the Institute: Prof.Dr.Jähnichen

Admin.Head: Dipl.-Ing.U.Nabert

**#005\*K3JAN91\* Society for Mathematics and Data Analysis, Research center for Innovative Computer Systems and Computer Technology (FIRST)**

**Research objectives:**

The specific knowledge of the working groups GMD-FIRST and the AdW-institutes ZKI and IIR will be combined to create new centers of emphasis in a new GMD institute.

The contributions of AdW groups to be incorporated are:

ZKI group (Prof. Wilhelmi)

- Parallel computation and "mistake-tolerant" systems
- VHDL-specifications and their verification
- Optimal data structures for non-numeric assignments on high performance computers

ZKI-group (Prof. Sydow)

- Parallel simulation.

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**#006: Geo-Research Center Potsdam**

Geo-ForschungsZentrum Potsdam

Telegrafenberg A 17

Albert-Einstein Straße

D/O-1561 Potsdam

Telephone: +49 (331) 310-310 or 310-316

Telefax: +49 (331) 22824

Scientific Leader: Prof.Dr.Emmermann

Admin.Leader: Dr.B.Raiser

(of the Head of the Founding Committee, Prof.Dr.Peter Giese): +49 (30) 838-3972, Telefax: +49 (30) 832-6029

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#006/02  
30 OCT 92

**#006\*K3JAN91\* Geological Research Center Potsdam**

**Research objectives:**

Extra-university basic research in the area of geology especially the continental lithosphere with the following objectives:

1. Geological basic research including global dynamics of the lithosphere, composition of the earth, structure and evolution of the continental lithosphere as well as properties, condition and processes of the continental lithosphere.
2. Taking care of joint and overall projects, especially in cooperation with universities and with international institutions;
  - Providing a competent project management for larger projects in the geo-sciences; (KTB, DEKORP)
  - Being in charge of future drill sites, observatories (geophysics, geomagnetics, geodetics, earthquakes) and an appliances park
  - setting up a world data center for data of the lithosphere covering the national and international realm;
  - providing education (in the frame of the UNESCO), making available experiences and equipment (Disaster Task Force) for developing countries.

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**#007: Research Center for Continental Polar Research of the "Alfred-Wegener Institute for Polar and Ocean Research (AWI)"**  
Forschungsstelle für kontinentale Polarforschung des "Alfred-Wegener Institus für Polar- und Meeresforschung (AWI)"

Telegrafenberg

Albert Einstein Straße

D/O-1561 Potsdam

Telephone: +49 (331) 310-277

Telefax: +49 (331) 310-621

Admin.Leader: Dr.R.Paulenz

**#007\*K3JAN91\* Research Center for Continental Polar Research**

**Research objectives:**

Extra-university basic research in the area of continental polar research with emphasis on

1. Atmospheric aerology and atmospheric circulation
2. Periglacial research
3. Biology of mammals and birds

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#008/01 - #009/01  
30 OCT 92

**#008: Institute for High-Energy Physics; DESY Zeuthen (IfH);  
(DESY= German Electron Synchrotron, Hamburg)**

Institut für Hochenergiephysik (IfH); DESY Zeuthen  
(DESY=Deutsches Elektronen Synchrotron)

Platanen Allee 6

D/O-1615 Zeuthen

Telephone: +49 (33762) 50

Telefax: +49 (33762) 5282

Bitnet F1SOD@DHHDESY3

Director: Prof.P.Söding

This branch laboratory of the Hamburg DESY is transformed from the former Academy of Sciences Central Institute for High-Energy Physics in a somewhat rural south-eastern suburb of Berlin.

**#008\*K3JAN\* DESY Zeuthen**

Research objectives:

- Continuation of long term large experiments at accelerators in CERN, DESY and the countries of the former Soviet Union
- Intensification and expansion of research at DESY accelerators through independent contributions by Zeuthen scientists, supplementing and expanding the research programs of HERA and DORIS
- Setting up a program for the development of modern detector technology

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**#009: Fusion-Oriented Plasma Physics, branch lab of the Institute for Plasma Physics**

Fusions-Orientierte Plasmaphysik, Aussenstelle des Instituts für Plasmaphysik (IPP)

Mohren Straße 40/41

Postfach 1250

D/O-1086 Berlin

Telephone: +49 (30) 2036-6101 or 2036-6102

Telefax: +49 (30) 2036-6111

Director (acting) Prof.Dr.K.Pinkau

Admin.Leader: Dr.W.König

**#009\*K3JAN91\* Branch Lab of the Institute for Plasma Research (IPP): "Fusion-Oriented Plasma Physics"**

Research objectives:

- Continuation of research done by ZIE of the former AdW in the field of fusion oriented plasma physics with emphasis on interaction of plasma and wall research following the already existing integration into the international fusion research, in particular in the program agreed upon with the Max Planck Institute for Plasma Physics.



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#009/02 - #011/01  
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- Continuation of the work of the Thoorio group with emphasis on cooperation with the experimental groups.

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**#010: Research Group Photo-Voltaics of the "Hahn-Meitner Institut"**

Forschungsgruppe "Photovoltaik" des Hahn-Meitner Institut -  
Rudower Chaussee 5, Haus 12.8  
D/O-1199 Berlin=Adlershof  
Telephone: +49 (30) 6704-4251  
Telefax: +49 (30) 6704-4249  
Scientific Manager: Prof.Dr.E. te Kast  
Financial Manager: Dr.Nettseim

**#010\*K3JAN91\* Hahn-Meitner-Institute Research Group  
"Photovoltaics"**

**Research objectives:**

The Photovoltaic department will examine in physics and technology the basic phenomena and properties of photovoltaic structures on silicium basis. The general aim of the studies can be described as follows: new concepts allowing a high degree of efficiency will be developed for future technology and use of material. On the basis of a highly developed Si-technology and the knowledge gained with regard to high efficiency cells the development of a layer combination on Si-basis seems to have a great potential. Investigations in that direction should emphasize a better understanding of poly- and compact- grained layers and layer systems including suitable hetero-transitions and new materials (Silicides and other Si-compounds). A decisive physical problem in that direction can be the understanding and control of inner and outer interfaces.

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**#011: Institute for Polymer Chemistry (Working Group Membrane Research of the Institute for Chemistry of the GKSS)**

Institut für Polymerenchemie des GKSS Instituts für Chemie  
Kant Straße 55  
D/O-1530 Teltow  
Telephone: +49 (3328) 460  
Telefax:  
Director: Prof.Dr.Paul

**#011\*K3JAN91\* Institute for Polymer Chemistry (Workgroup Membrane Research of the Institute for Chemistry of GKSS)**

**Research objectives:**

- Basic research with the aim to develop mass-produced film membranes, with emphasis on molecular design, polymer structure,

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border tracts and transport including regulated separation phases.

- Development of high performance membranes using stable organic and unorganic membrane material whose properties can be adjusted to the different problems.
  - Development of modal concepts for specific applications.
- =====

**#012: Institute for Research of Rivers, Lakes, and Underground Waters of the GKSS**

Institut für Gewässer-Forschung der GKSS

Wall Straße 17

D/O-3010 Magdeburg

Telephone: +49 (391) 372-0

Telefax: +49 (391) 372-200

Director (acting): Dr.R.-D.Wilken

**#012\*K3JAN91\* Institute of the GKSS for Research of Rivers, Lakes, and Underground waters**

Research objectives:

- Flowing water research

Overall body of water including hydrological and microbiological aspects in the river system of the Elbe on the basis of special stress situations especially of the Mulde and Saale rivers.

- Standing water research

Limnology of strip mining and quarries, development of renaturalization concepts as well as application of ecotechnological principles for lake sanitization through an ecosystem-oriented limnological research.

- Underground water research

Subterranean river systems in bodies of water communicating with above ground standing waters.

Chapter 4.2:

Institutes of the "Blue List" = Blaue- Liste Institute  
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For an explanation of this group of institutes see in Part A of this REPORT chapter 4.5.2.4.

**#013: Paul-Drude Institute for Electronics of Solids**

Paul-Drude Institut für Festkörperelektronik (PDI)

[former name: Institute for the Physics of the III-V Semiconductors  
= Institut für die Physik der III-V Halbleiter]

Hausvogtei Platz 5-7

D/O-1086 Berlin

Telephone: +49 (30) 20377-352 or -356

Telefax: +49 (30) 238-4528

Director: Prof.Dr.K.Ploog, Prof.Dr.F.Koch

Administr.Leader: Dr.C.G.Schulz

**#013\*K3JAN92\* Institute for the Physics of III-V-Semi-Conductors**

Research objectives:

Basic research with meso structures on III-V-semi-conductors.

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**#014: Institute for Solid State Physics and Materials Research**

Institut für Festkörper- und Werkstofforschung e.V. (IFW)

Helmholtz Straße 20, PSF 16

D/O-8027 Dresden

Telephone: +49 (351) 4659-380

Telefax: +49 (351) 4659-500

Telex: 2131 dd

Scientific Director (acting): Dr.H.Eschrig

Admininstr.Director (acting): P.Joehnk

Employees: 240 (+55) / 295

Departments:

Institute for Solid State Research

Institute for Metal Materials and Solid State Analytics

Region "Research Technics"

**#014\*K3JAN91\* Institute for Solid State Physics and Material Research**

Research objectives:

- Physical and chemical foundations of Materials Research
- Synthesis and presentation of new inorganic materials

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- Development of processes of production and use (implementation) of new inorganic materials
- Physical and chemical characterization of new inorganic materials and the development of methods to be applied.

#014\*NJUL91\* Central Institute for Solid State Physics and Materials Research.

This report is one of several pertaining to a visit to Leipzig, Halle and Dresden, Germany, 9-11 July 1991. These visits took place with the assistance of the American Embassy, Bonn and the American Consulate-General, Leipzig. Mr. Frank Kinnelly, Science Counsellor in Bonn and/or Mr. Nicholas Dean, Vice Consul in Leipzig, were co-participants in the meetings and provided important background information and logistical support. Except where otherwise indicated, the opinions expressed are those of the persons visited - as understood by the drafter.

The Central Institute for Solid State Physics and Materials Research is Directed by Prof. Dr. Wolfgang Pompe. He is assisted by Dr. Klaus Müller. The Central Institute is presently composed of eight research institutes specializing in various aspects of materials and solid state physics research. However, as a result of the recently-concluded evaluation by the federal Science Council, the administration of the various units will be changing. Four institutes will be consolidated to form the Institute of Solid State Research and Materials Science, employing about 300 people. An additional 300 people will be employed in two Fraunhofer Society Institutes, a Fraunhofer Society research group attached to the Fraunhofer Institute in Bremen (powder metallurgy and laminated materials) and a Max-Planck Society Institute (on mechanical and heterogeneous media, paired with the MPS institute in Stuttgart). The total number of people employed in the new institutional framework will be down from 913 at the end of March, 1990. These reductions and others taking place in eastern Germany are likely to be explosive.

The institute has been pursuing a number of lines of research, including quantum mechanical and chemical analyses of high-temperature superconductors, high conductive polymers, multilayer structures in the nanometer range, superlattices, CVD and PVD multi-layering and laser technology surface treatment techniques. In ceramics, work is focussed on silicon nitrides, silicon carbides and aluminum functional ceramics. Applied research has included high-speed quenching work on both amorphous metals and ceramics, and various aspects of powder metallurgy and fibre technology.

The institute currently has some excellent equipment and facilities, including for the production and forming of ceramic/metal powders and for the production of fine ceramics, lathes, rolling mills and other equipment for the processing of materials, and

sputtering and vapor deposition equipment. There are facilities for electron beam microscopy (including in situ studies), and for ion beam microscopy. A number of lasers are on hand for application of coatings, for the treatment of metals and other materials and the deposition of thin films. A Rofin 6Kw CO<sub>2</sub> laser is used for the coatings, and a 400 w laser is used for cutting (with a 1Kw model to be delivered). A 2 joule excimer laser pulse is used for the deposition of thin films and superlattice work.

The institute had many industrial connections in the DDR but industry has gone down a great deal since the unification of Germany. Programs of the federal Ministry of Research and Technology have helped the institute to obtain contacts and contracts in the western part of Germany and elsewhere. The institute still has good contacts with researchers in the USSR, where basic research in fields related to the institute's work is very good. There is a technical university right next to the institute [co-location of its institutes with universities is a common practice with the Fraunhofer Society]. Dr. Pompe and other institute researchers are professors at the university, and while there are normally students working in the institute's laboratories, that number is likely to be going up.

**NSF\EUROPE Comment:** This institute is located in a large building with facilities for both small pilot plants and for laboratories employing a great number of techniques for materials development, production, testing and modification. Its successor organizations testify not only to the range of its research - from the fundamental to the industry-applied - but to the quality of that work. While there were 100 of the institutes of the former Academy of Sciences of the GDR being evaluated by the Wissenschaftsrat, only 17 Fraunhofer Society institutes are being set up in the east (and fewer Max Planck institutes), and 20 "blue list" institutes.

**#014\*Q1OCT91\*** Institut für Festkörper- und Werkstofforschung Dresden e. V. = Institute for Solid State and Materials Research Dresden, Germany; abbreviation: IFW Dresden.

1. General Survey

1.1. Address, Telephone, etc.: {see above}

1.2. Setting, Environment, Access:

The institute is located in Dresden, the capital of the "Freistaat Sachsen (Saxonia)". The main part of the institute is within the campus of the Technical University of Dresden, about 1 km south of the main railroad station.

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1.3. Organization, Structure, Hierarchy:

The institute has 3 scientific departments (Institute for Solid State Research, Institute for Metallic Materials, Institute for Solid State Analysis and Structure Research), a technical department and an administrative department. The institute has 2 directors (scientific and administrative director).

Contact: Dr. M. Bernhardt

1.4. Employees:

	IFW	"soft money" workers
Scientists:	122	55
technicians:	144	12
Support staff:	30	

1.5. Institute Publications, Host Conferences:

The IFW has been set to work on 2 January 1992. Planned host conferences 1992 are e.g.:

- "Meeting 1992 of the Society of Crystal Growth"  
Dresden, March 1992
- "22nd Annual International Symposium on Electronic Structure of Solids"  
Schellerhau near Dresden, March 1992
- "XXII European Conference on Dynamical Properties of Solids"  
Schellerhau near Dresden, September 1992

2. HISTORY OF THE INSTITUTE:

2.1. Long-Term History, Founding of the Institute, Tradition:

Long-term precursors are:

Forschungsinstitut für metallische Spezialwerkstoffe;  
Institut für Metallphysik und Reinststoffe;  
Institut für Tieftemperaturphysik.

All these institutes were founded in the middle of the 1950's of this century. They joined in 1969 into the Central Institute of Solid State Physics and Materials Research of the Academy of Science of GDR, the immediate predecessor of the IFW Dresden e. V.

3. RESEARCH:

{see the following description under #014\*M6AUG92\*}

4. GERMAN UNIFICATION, TRANSITION

4.1. Recommendation of the Wissenschaftsrat (Science Council):

Continuation of the scientific work of the former Central Institute for Solid State Physics and Materials Research will take place in the following institutions:

- Institute f. Solid State & Materials Research Dresden eV {#014}
- Fraunhofer Establishment for Ceramic Technologies and Sinter Materials {#047}
- Fraunhofer Establishment for Materials Physics and Lamination Technologies {#051}

- Fraunhofer Branch Lab for Microstructure of Materials and Systems {#058}{?}
- One Max-Planck Working Group.

#### 4.2. Special Problems of an Administrative Character:

As with many institutions in the former GDR, supply problems for literature and instruments persisted because of the lack of foreign currency. Existing laws reduced the travel activity to the West to almost zero. In these regards, we now face restrictions only because of the scarcity of funds.

#### 4.3. International Contacts:

Because of the political situation of the period of the GDR, the contacts to Eastern neighbors (former U.S.S.R., CSFR, Hungary) were emphasized. If that was of mutual interest, the existing contracts were maintained during the German reunification. Beginning in 1991 not only the restrictions for travels etc. to the West disappeared, but the outspoken hospitality of Western institutions and special support activities, possibilities for long-term scientific sojourns at Western institutions exist. Intensive contacts have been established with KFA Jülich, KFK Karlsruhe and Max-Planck Institutes in Düsseldorf and Stuttgart (all in West-Germany)

#### 4.5. Released Scientists:

Twenty-four scientists of the former institute have not been incorporated into the new institutions listed above under 2.1.

#014\*M6AUG92\* {The following is a brief extract and translation from information material by the cognizant Ministry of Sachsen (Saxonia). That material gives much detail for each of the scientific groups mentioned herunder, but it was not possible to get it translated into English in the short time left for the completion of the REPORT:}

#### Focal Points of Research:

##### Solid State Research:

- Supraconductivity and magnetism
- Thin layers and deposition processes
- Solid State Chemistry
- Electrochemistry and conductive polymers

##### Metallic Materials:

- Procedures of metallic phases
- Processes of structure establishments
- Solidity and influences from the environment
- Tribology
- Special materials
- Melting metallurgy
- Transforming and thermal treatment

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Structural Solid State Analytics and Structure Research:  
Surface- and micro-range analytics  
X-ray structure research  
Chemical analysis.

{end of description of #014}

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**#015: Institute for Polymer Research, Dresden (IPF)**  
Institut für Polymerforschung Dresden (IPF)  
Hohe Straße 6  
D/O-8010 Dresden  
Telephone: +49 (351) 4658-318  
Telefax: +49 (351) 4658-214

Scientific Director (acting): Prof.Dr.Jacobasch  
Administrative Director (acting): Dr. Lunkwitz  
Employees: 70

Departments:  
Macromolecular Chemistry  
Physical Chemistry and Physics of the Polymers  
Polymer Materials.

**#015\*K3JAN92\*** Institute for Polymer Research  
Research objectives:  
- Synthesis and chemical modification of polymers  
- Development of new connecting materials with polymer matrix  
- Study of the connection between the inner structure of polymer materials and their processing properties.

**#015\*NJUL91\*** Institute of Polymer Technology, Dresden, 11 July 1991  
This report (NSF Europe Report No. 34) is one of several pertaining to a visit to Leipzig, Halle and Dresden, Germany, 9-11 July 1991. These visits took place with the assistance of the American Embassy, Bonn and the American Consulate-General, Leipzig. Mr. Frank Kinnelly, Science Counsellor in Bonn and/or Mr. Nicholas Dean, Vice Consul in Leipzig, were co-participants in the meetings and provided important background information and logistical support. Except where otherwise indicated, the opinions expressed are those of the persons visited - as understood by the drafter.

The Institute of Polymer Technology is directed by Prof. Dr. Manfred Ratzch, and he is assisted by Dr. F. Wittig. The institute was founded in 1947 as a natural fibre technology research organization but is moved over the years into polyamide, polyester and glass as materials of interest. In 1985, it was renamed to reflect its focus on polymer technology and polymer processing and materials. The institute employs 220 people today - down from 270 when Germany was unified. The federal Science Council



(Wissenschaftsrat) has conducted an evaluation of this institute since it was an institute of the Academy of Sciences of the former German Democratic Republic (DDR, GDR). The Wissenschaftsrat review was very favorable; its work on chemical modification and interface phenomena are on par with the international level, and research plans fit in well with polymer research efforts elsewhere in Germany. The institute will continue as a "blue list" institute, receiving support from the federal government and from the Saxony Land government. The number of employees in the new institute will be 200, and about six or seven young researchers have left for jobs in western Germany, including in industry. There are about 20 doctoral students working at the institute, and three of its staff members give lectures at the Technical University in Merseburg.

The research program today is broken into three main fields [see the Appendix for details\*]:

- Polymer Structures, including polymer synthesis and physical and chemical modification.
- Polymer Processing, including lamination processes fibre formation, molding and reactive polymer blends.
- Material Properties, including measurements of mechanical and thermal properties.

The Main Divisions of the institute are Reactive Polymers and Blends (structure, property and blends); Interfaces, Fibers and Polymer Composites; Surface Modification of Polymers; Modification and Recycling; Mechanical Plastics Characterization (deformation behavior and rheology, mechanical materials testing); and Polymer Analytics. There is also a Technical Services Division, in which instruments are made-to-order.

The institute works on reactive polymer compounding to obtain new blends, sometimes requiring interface and surface modification of the polymers.

**NSF\EUROPE Comment:** This institute is located in several buildings of a well-maintained campus. Like many of the other research institutes of the now-defunct DDR Academy of Sciences, its work was oriented toward helping industry. The institute today is continuing to try to win contracts but is searching not only in eastern Germany but elsewhere in Europe and in the United States. The German Federal Ministry of Research and Technology is helping this institute (and presumably others) to find contracts in

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\*) a brochure "Institute of Polymer Technology Dresden" with tables, figures and references, obviously issued by the institute, is too voluminous to be reproduced here.

Western Germany, and in R&D programs of the Commission of the European Communities. The institute was responsible for some key technologies in the electronics industry centered in Dresden, including the lamination of circuitry to circuit boards. Since the demise of the DDR, the institute has been upgrading its equipment and instrumentation quite significantly, both with cash made available by the government for purchases and from industry donations. The latter are prominently acknowledged on the equipment in the laboratory or on the shop floor.

**#015\*M6AUG92\*** {the following information is an extract from material supplied by the cognizant ministry of Sachsen, Saxonia. There was not sufficient time to translate the whole information, so only the headlines are given here.}

Focal Points of Research

Macromolecular Chemistry, with four subdivisions  
Physical Chemistry and Physics of the Polymers, three subdivisions  
Polymer Materials, three subdivisions.

{end of description of #015}

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**#016: Research Institute of Molecular Pharmacology**  
Forschungsinstitut für Molekulare Pharmakologie  
Alfred Kowalke Straße 4  
D/O-1136 Berlin  
Telephone: +49 (30) 51630  
Telefax: +49 (30) 512-8014  
Telex: 112297 aikam dd

Name of the institute in the former GDR: Institut für  
Wirkstoffforschung (Institute for Drug Research)\_

Director of the (new) founding committee: Prof. Holsboer  
Founding Leader: Prof. Franz Hofmann  
Director at the time of our visit: Prof.Dr.Peter Oehme

**#016\*K3JAN92\*** Research Institute for Molecular Pharmacology  
Points of emphasis  
- Study of adaptation processes (effect of peptide mediators)  
- Peptide research (peptide synthesis)  
- Medical chemistry  
- Determination of peptide properties  
- Computer supported development of pharmaceuticals.

#016\*Q1DEC91\* QUESTIONNAIRE (see above under chapter 1.3) submitted by Institut für Werkstofforschung (Institute for Drug Research, now Institute for Molecular Pharmacology) on 11 December 1991:

## 1. GENERAL SURVEY

1.1. Address, Telephone, etc.: see above

1.2. Setting, Environment, Access

The Institute is centrally located in the eastern part of Berlin, in the district of Lichtenberg. It can be directly reached by car. The underground RR (U-Bahn) station "Friedrichsfelde" is about 100 m from the Institute. The suburban RR (DS-Bahn) station "Friedrichsfelde-Ost" is in 10 min walking distance.

1.3. Organization, Structure, Hierarchy

The Institute of Drug Research was a part of the former Academy of Sciences of the GDR. - Its director was then and is now: Prof. Dr.med.habil. Peter Oehme. - The Institute, being mainly engaged in biomedical basic research in the fields of medicine, pharmacy, and chemistry, has three scientific departments:

- o Adaptation and addiction research

Head: Prof.Dr.med.habil.Peter Oehme

- o Peptide research

Head: Dr.sc. Michael Bienert

- o Medical chemistry

Head: Prof.Dr.sc. Rainer Franke.

Interdisciplinary interaction between the principal research subjects constitutes the specific character of the Institute.

1.4. Employees

For the time after 01 January 1992, the approximate number of personnel is expected to be as follows:

100 positions for scientists and technicians

90 additional employees financed by soft money.

1.5. Institute Publications, Host Conferences

The Institute publishes regularly the scientific reports called "Beiträge zur Wirkstofforschung" ("Contributions to Drug Research"). - The Institute organizes the "Symposium on Drug Research" with international participation, every 4th year.

## 2. HISTORY

2.1. Long-Term History, Founding, Tradition

The Institute of Drug Research was founded in 1976. It is one of the smaller biomedical institutes of the former Academy of Sciences of the GDR. The Departments of Peptide Research and of Adaptation Research originated from the Central Institute for Molecular Biology of the Academy of Sciences, GDR. Later on, the scope of research subjects was extended to include medical pharmacology as well as heart-and-circulation pharmacology.

Alternatives to animal experiments constitute an additional principal subject; other departments exist for analytical and technological services.

### 3. RESEARCH

#### 3.1. Scientific Areas Covered:

(A quotation from a paper prepared for the Evaluation Commission of the "Wissenschaftsrat" - Science Council- of the Federal Republic, July 1990, translated:) The Institute for Drug Research has three scientific departments focussing on five principal research subjects:

#### ADAPTATION AND ADDICTIVE RESEARCH:

Emphasis is placed on the neuropeptide Substance P. This peptide is released from the nerve fibers of the digestive tract, from the central nerve system, and from the endocrine organs. Substance P is supposed to be an important factor in the mechanism of coping with stress. Clinical pharmacological experiments are used to study the interrelationship of the regulatory function of Substance P, and the release of catecholamines; this has been demonstrated in animal experiments.

In addition, Substance P is being investigated under the aspect of structure-active relationships.

In recent years, the research of this Department has been extended to include investigations on the interrelationship of stress and addiction.

#### PEPTIDE SYNTHESIS:

Investigations were concentrated on biological effects of peptide structures. As Substance P is of interest here, too, there is a close relationship to Adaptation Research. Various other peptides are being studied under the aspects concerning their interaction with cells, concerning the endocrinology of reproduction, and concerning their role in the immune system.

Both, the results of structure-activity investigations, and the synthetic peptides, are to be considered and/or applied in the development of new therapeutic approaches. The spectrum of methods in this Department includes all the usual techniques for estimating and analyzing physico-chemical parameters. Peptide synthesis is facilitated by devices that have been developed in the Institute.

Another subject of this Department is the biopharmacy of peptides, especially pharmacokinetics and metabolism of peptides in the organism. In recent years, a re-orientation toward adaptation and addiction research was accomplished here, too.

#### MEDICAL CHEMISTRY

In this Department, the interdisciplinary cooperation between chemistry, pharmacy and pharmacology is concentrated on finding new structures with pharmacologically important properties. The research methods employed cover the spectrum from classical structure-activity-analysis up to molecular design. The knowledge acquired thus far was of benefit to the other Departments as well as having been used for service work in the interest of external customers.

Appropriate computing systems have been used for molecular modelling as well as for the analysis of huge amounts of data. An own computer-aided model was developed for the purpose of pattern recognition in respect to chemical substructures and their biological effects. The work on synthesis of pyridyl-substituted heterocycles yielded interesting compounds with various pharmacological effects on the heart and circulation system.

Because of the methodological possibilities in the Department of Medical Chemistry, a close interrelationship exists to peptide research and to biomedical addiction research.

#### HEART AND CIRCULATION PHARMACOLOGY

This principal subject is concerned with the pathenogenetic and pharmacological aspects of distorted heart functions. Based on the known fact that the formation of free radicals is increased in ischemic heart tissue, the cardioprotective, antioxidative properties of a certain group of substances (pyridyl-substituted heterocycles) are being investigated under the aspect of cardiotone effects against heart insufficiency, for instance. In interdisciplinary cooperation with mathematicians and physicists, as well as with the Department of Medical Chemistry, knowledge has been gained about hemodynamic parameters in animal experiments whose biosignals had been analyzed by computer and stored in data bases.

#### ALTERNATIVES TO ANIMAL EXPERIMENTS

Future work on this principal subject aims at investigating the cytotoxic effects of pharmaceuticals by using cell systems (as alternatives to animal experiments) and at deriving quantitative results. Based on mathematical correlation analyses, results on the in-vivo toxicity of the compounds in question are to be obtained. As an additional task within this principal research subject, new vitality parameters will be studied for the characterization of cytotoxicity.

3.3. Problems being worked on after 01 January 1992.

In the future, it is intended to work on subjects from the molecular pharmacology, especially neuro-pharmacology, peptide-pharmacology, cell communication, biology of development and adaptation. There should also be place for more addiction research.

4. GERMAN UNIFICATION, TRANSITION

4.1. Wissenschaftsrat

The Institute was evaluated by the Science Council ("Wissenschaftsrat") on 15 December 1990 with the following result, presented here as a quasi-citation given by the Director of the Institute in re-formulating most of the information given on pages 41 to 49 of "Wissenschaftsrat Stellungnahme zu den außeruniversitären Forschungseinrichtungen in der ehemaligen DDR im Bereich 'Biowissenschaften und Medizin' - Drs.335/91; Düsseldorf, 5 July 1991" - (Science Council Statement regarding the extra-university research institutions of the former GDR in the domain of Bio-Sciences and Medicine):

The Institute of Drug Research is a scientifically active institution. Because of its qualified scientists in the rising generation it has a good potential, and it has developed several future-oriented ideas for research. Because of the close interconnection between the various principal research subjects, this institute represents a good example of interdisciplinary research.

The work on peptide synthesis and molecular design has attained high a quality level. The efficient though traditional chemistry groups are to be preserved by all means. The possible involvement of neuropeptides in addition development ought to be examined. In particular, clinical research must not be restricted to the peptide Substance P but has to cover the large number of recently found neuro-active peptides as well. Up-to-date although partially not novel but methodologically sound approaches are pursued in the Department of Heart and Circulation Pharmacology.

If heart and circulation research is enlarged in Berlin-Buch, a relocation of some groups is conceivable, yet there is also reason to do heart and circulation research in the new institute, especially if addiction will be investigated. The submitted concepts on addiction research appear to be well considered. The interdisciplinary connection of the three principal research subjects provides good conditions for a complex approach. Principally, the principal subjects mentioned ought to be pursued further with greater emphasis laid on molecular-pharmacological and cell-biological techniques. Basic research on addiction and adaptation might well be one principal subject of research that

among other things is funded by grants. A specialized institution for addiction research is not recommended. Moreover, we propose to take into consideration the replacement by in-vitro models of in-vivo experiments in suitable cases.

The scientists of the Institute are motivated and competent. The technical equipment, however, has in part not yet reached the level needed for coping successfully with international competition. The research work on peptide synthesis and on molecular design as presently being done at the Institute of Drug Research ought to be continued by all means thereby preserving the interdisciplinary character, as this work will serve to enrich pharmacological research in Germany.

Thus, the Science Council recommends the funding of a research institution for molecular pharmacology that should be oriented toward work on adaptation processes with addiction research as the ultimate goal. The scientists ought to be recruited from the core of the Institute of Drug Research (especially from the rising generation of scientists). The Institute should be organized in research groups which are independent within the principal research subjects. The competent younger scientists of the Institute, in particular, should be given the opportunity to develop.

The leading positions are to be appointed by a Founding Committee in a joint procedure with one of the university departments in Berlin. Close connection with the university should be implemented by undertaking lecturing tasks and tutoring diploma and doctoral candidates. The improvement of the Institute should be carried out according to a graduate plan, and at the final stage, it should provide for 80 to 100 jobs as a basis, one half of which should be filled with scientists, one third of them at the most permanent contracts. After some years, additional 90 employees should be supported by grants. At present, i.e., in the next three to five years, however, about 50 employees are to be paid by the Institute.

The Science Council recommends future support as a Blue-List Institute because the tasks of molecular-pharmacological research have supra-regional importance as well as federal science-political interest, and require a scientific capacity that by far surmounts the possibilities of a university institution. (End of the quasi citation).

The actual situation of the Institute is the following: Although the Institute was positively evaluated, it should be closed by the end of this year.

#### 4.2. Special Problems

There were many administrative restrictions in the former GDR concerning travel to the West, availability of sufficient computer systems and others, too. In 1991, however, the Institute was

granted financial funds by the Federal Government with the result that a high level of scientific equipment was obtained. Additional funds were provided for the participating in international congresses and for hosting foreign scientists at the Institute.

#### 4.3. International Contacts

The Institute entertained a large number of contacts to scientific institutions before 1989, especially to institutions of the Academies in the former Eastern Block countries. These relations were formulated in contracts which were to expire by the end of 1990. Because the future of the Institute is not clear, these contracts have not yet been renewed. The institutes of the Academy of Medical Sciences of the USSR are especially interested in further cooperation; the German response is still pending. There is the danger that these contacts will be lost, and with them the access to a highly developed scientific potential in the USSR.

#### 4.5. Released Scientists

By 10 December 1991, the future situation of the scientists at the Institute is not yet determined. They do not have a promise that they will continue their work at a future Institute of Molecular Pharmacology.

{end of description #016, there are no #017 and #018}

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#### #019: Institute for Astrophysics

Institut für Astrophysik

Rosa-Luxembourg Straße 17a

D/O-1591 Potsdam-Babelsberg

Telephone: +49 (331) 762-0, or -223(secr't'y) or -227(Prof. Rädler)

Telefax: +49 (331) 762-0200 or -309

Telex: 15471 ASDW RZB

E-Mail: ARLT@VAX.HMI.DBP.DE (that is the E-Mail for the Hahn-Meitner Institute but it also serves the Astrophysical one).

Director (acting): Prof.Dr.Karl-Heinz Rädler

Admin.Leader: Herr Ahlberg

#### #019\*K3JAN92\* Institute for Astrophysics

Research objectives:

1. Cosmic plasma and magnetic fields, sun and star activities
2. Extragalactic astrophysics and cosmology

#### #019\*Q3OCT91\* "CENTRAL INSTITUTE FOR ASTROPHYSICS OF THE ACADEMY OF SCIENCES BERLIN" (Questionnaire on..)

##### 1. GENERAL SURVEY

- 1.1. Address, Telephone etc.: see above



### 1.2. Setting, Environment, Access:

The administration is housed in the building of the traditional Sternwarte (Astronomical Observatory) Potsdam-Babelsberg (at the address given above, at the northern or upper end of the Rosa-Luxembourg Straße) in a park in which other buildings house some parts of the institute (and further buildings belonging to other institutions). Other parts of the institute, including the Einstein-Turm (Einstein Tower) are housed on the Telegrafenberg in Potsdam (in the same area with the Meteorological Observatory). The Observatory for Solar Radio-Astronomy is situated in Trensdorf. It is, however, not certain whether this set-up will remain for long or not. See next section about possible re-organization.

### 1.3. Organization, Structure, Hierarchy:

The organization scheme for the future has not yet been determined. It seems to be possible that institutes in Potsdam will be united into one organization.

## 2. HISTORY

### 2.1. Long Term History, Founding, Tradition:

We are seeing here a very traditional institution. Initiated, among others, by Gottfried Wilhelm Leibniz, the precursor of the Prussian Academy of Sciences was founded by the Elector Friedrich III (the later King Friedrich I of Prussia) on 11 July 1700 in Berlin. Already on 18 May of the same year, a first official act was leading to the founding of an astronomical observatory (einer Sternwarte). This was established in a special new building in 1711, moving 1835 into another new building (by Karl Friedrich Schinkel as an architect, supported by Alexander von Humboldt). In the year 1846, Johann Gottfried Galle discovered the planet Neptune, Karl Friedrich Kästner discovered the oscillation of the Earth's poles in 1888, and Eugen Goldstein discovered the channel rays in 1886. In the mid 19th century, Rudolf Kirchhoff and Robert Bunsen developed the spectral analysis by which Astrophysics could be added as a new branch to Astronomy. To provide facilities to apply this and other new techniques for the investigation of the sun, 1871 the founding of a special observatory on the Telegrafenberg in Potsdam was suggested and built from 1876 to 1879.

Albert A. Michelson (1852-1931, Captain, US Navy) conducted 1881 in the basement of the main building of the Astrophysical Observatory on the Telegrafenberg in Potsdam for the first time his famous experiment on the velocity of light in various directions vs. the rotation of the Earth which led to Einstein's Relativity Theories. This first experiment was successful, it already had the now famous result. It was repeated some years later by Michelson et al., in the U.S., with the same result but only then that result was believed.

In the year 1913, the Berlin Astronomical Observatory was transferred to the Babelsberg into the building which now houses the administration of the Zentralinstitut für Astrophysik and also a remarkable museum of astronomical, astrophysical and general-physical instruments including the 1915 65-cm refractor. (The 120-cm mirror-telescope was transferred to the U.S.S.R. after WW II).

The names of many scientists who have worked at this institute or have also directed it, are familiar to the astronomers and astrophysicists around the world.

2.2 .Recent History (see also below under 4):

The present Zentralinstitut für Astrophysik was established in 1969 as an institute of the Academy of Sciences of the GDR in Berlin.

3. RESEARCH

{ not reported in this questionnaire}

4. GERMAN UNIFICATION, TRANSITION

4.1 Wissenschaftsrat (Science Council):

It will be difficult to fully implement the recommendations of the Wissenschaftsrat; it may turn out to be more practical to unify several institutes situated in Potsdam.

4.2. Special Problems of an Administrative Character:

As of this writing, the Founding Commission for the new institute has not yet been constituted. Therefore, several possibilities are still under consideration, even to accept an Arbeitsgruppe (Working Group) of the Max-Planck Society, to allow it to become a Projektgruppe (Project Group) which could indicate that at some later time there will be a Max-Planck-Institute.

{end of description of #019}

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**#020: Institute for Applied Analysis and Stochastics**

Institut für Angewandte Analyse und Stochastik (AAS) Berlin

Mohren Straße 39

D/O-1086 Berlin

Telephone: +49 (30) 2037-7596

Telefax: +49 (30) 200-4975

Founding Director: Dr.Reich

**#020\*K3JAN91\* Institute for Applied Analysis and Stochastics**

Research objectives:

- Integral equations
- Non-linear differential equations
- Numerical methods
- Common differential equations

- Stochastic systems
  - Stochastic analysis
- 

**#021: Research Center Rossendorf (FZR)**

Forschungszentrum Rossendorf (FZR)

Bautzener Landstraße

PF 19

D/O-8051 Dresden

Telephone: +49 (351) 591-2350

Telefax: +49 (351) 36174

Scientific Manager: Prof.Dr.W.Häfele

Administr.Manager: Herr Paniewski

Employees: 445

**#012\*K3JAN92\* Research Center Rossendorf (FZR)**

Research objectives:

1. Nuclear and heavy ion physics (including theory)
2. Material research with ion radiation, application of high and low energy ion radiation for the modification of semi-conductors by implementation.
3. Bio-organic and radio-pharmaceutical chemistry, positron-emission-tomography
4. Neutron scattering, structure and texture analysis research
5. Radiochemistry

**#021\*Q3OCT91\* Research Center Rossendorf, questionnaire**

**1. GENERAL SURVEY**

1.1. Address, Telephone etc.: see above

1.2. Setting, Environment, Access:

In a suburb of Dresden, the capital of Saxonia, about 15 km East from center of town, along Bautzener Landstrasse (Bundesstrasse 6), through Rossendorf and then at the right hand side of road, set back a bit.

**1.3. Organization, Structure, Hierarchy:**

Essentially an institute of the "Blue List" (i.e. financed about 50:50 by the Federal and the Land governments). Plan is to divide it into five departments with 10 divisions.

Acting Director: Prof. Dr. Wolf Häfele, formerly Jülich after retirement

**1.4. Employees:**

500 for Blue List Institute, among them about 200 scientists and engineers

**1.5. Institute Publications, Host Conferences:**

Individual divisions submitted reports, about 750 have already been done, will be continued.

## 2. HISTORY

### 2.1. Long Term History, Founding, Tradition:

1956 founded , institute of the Academy of Sciences of the GDR;  
largest institute under this Academy.

## 3. RESEARCH {not reported in this questionnaire}

## 4. GERMAN UNIFICATION, TRANSITION

### 4.1 Wissenschaftsrat (Science Council):

Founding Commission has met already twice

### 4.2. Special Problems of an Administrative Character:

No essential problem with computers because they already had begun  
in the GDR to replace ROBOTRON by others, compatible with IBM.

### 4.3. International Contacts:

Close with EAST, are being continued, some problems of a financial  
nature. With West restricted, but some could work temporarily in  
Western countries. Some employees also to USA, giving lectures,  
(one of the them for half a year acting as consultant, but that was  
now!).

## 7. NOTES FROM VISITS COPIED FOR EVALUATION

### 7.3. Additions from Memory:

The Forschungszentrum Rossendorf is planned with 5 institutes in  
it, but the fate of the Research Nuclear Reactor Rossendorf and of  
the institute for "decontamination technology" (not an exact  
translation) seems to be still undecided.

#021\*M6AUG92\* The cognizant land ministry in Dresden has provided  
detailed listing of the scientific activities at this Research  
Center. Time for a full translation is not available now, therefore  
only the headlines are given below:

### Research Focus Areas:

#### ***Ion Beam Physics and Materials Research***

*Ion-beam supported modification of material*

*Solid state analytics*

#### ***Nucleus and Hadron Physics***

*Subatomic physics*

*Heavy-ion physics*

#### ***Safety Research: Assessment of the Planned Safety and the Operation Safety of Nuclear Reactors of the Soviet WWER Series***

*Analysis of trouble cases*

*Neutron "Versprödung": materials investigation; neutron dosimetry*

*Mechanical integrity*

*Plasma neutron source*

*Regenerative energies*

G704W42-19  
#021/03 - #022/01  
02 NOV 92

**Bio-Organic and Radio-Pharmaceutic Chemistry: Long-Term Basic Research on Specific Tracer Concepts and Tracer Developments for Medicine**

Tracer design  
Tracer evaluation  
Tracer application

**Radio Chemistry: Investigation of Transport and Distribution Processes of Dangerous Materials**

Organic tracer chemistry  
Decontamination chemistry; Eco-Radio-Chemistry  
Solid-body reactions, aerosols.

{end of description of #021}

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**#022: Institute for Non-Linear Optics and Time-Resolved Spectroscopy**

Institut für Nichtlineare Optik und Kurzzeitspektroskopie (INOK)  
Rudower Chaussee 6  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-2585 or 6704-3951  
Telefax: +49 (30) 6704-4494 or 6704-2386

Director (acting): Prof.Dr.Witlof Brunner  
Admin.Leader: F.Schröder

[Description of Institute #022 Continued Next Page]

G704W42-20  
#022/02 - #023/01  
01 NOV 92

**#022\*K3JAN92\* Institute for Non-Linear Optics and Time Resolved Spectroscopy**

**Research objectives:**

- I. Time-resolved spectroscopy
  - Generation and application of fs-impulses
  - non-linear optics and spectroscopy for the generation of short impulses
- II. Non-linear optics and spectroscopy
  - low dimensional systems
  - gas phase processes and clast
  - molecular citation state
- III. High performance laser physics and its application.

**#022\*M3AUG91\*** Basic and applied research on optical signal processing in the ultra-short-time region, application of non-linear optical methods for the ultra-short-time measuring technology and the investigation of rapid photophysical and photochemical processes in the sub-picosecond range in molecules, clusters, mesoscopic semiconductor systems and biological specimen.

Research and development efforts for the optimization of laser optics and laser-resonators, and on high performance and impulse-gas-lasers. It is expected that this institute would be complementary in an excellent manner with the synchrotron-radiation-source BESSY II which is planned for the research region Berlin-Adlershof.

{end of description of institute #022}

**#023: Institute of Low Temperature Plasma Physics**

Institut für Niedertemperaturplasmaphysik

Robert-Blum Straße 8-10

D/O-2200 Greifswald

Telephone: +49 (3834) 5991

Telefax: +49 (3834) 5994

Founding Director: Prof.Dr.R.Winkler

Admin.Leader: Herr Dieter Schlott

Employees: 50, including 20 scientists

**#023\*K3JAN92\* Institute for Low Temperature Plasma Physics**

**Research objectives:**

- Basic research in the areas of low temperature plasma and gas discharge physics
- Use of low temperature plasma in light and laser technique
- Study of plasma for gas laser stimulation with high temperature effect of impulse gas laser
- Thermodynamic and transport properties of plasma

- Methodical development of plasma spectroscopy
- Study of kinetics of anisothermal, pulsed plasma
- Theoretical work of important caustic plasma and plasma coating procedures
- Deposition procedure in non-thermal plasma for plane modification and improvement (diamond and polymer surfaces)
- Work on the characteristics of plasma in low pressure gas discharge lamps and with display discharges
- Diagnostic methods

**#023\*NMAR92\* NSF Europe Report No. 51; March 11, 1992**

**Visit to Greifswald: Institute for Low Temperature Plasma Physics,  
6 February 1992**

This report covers one portion of a visit to the German land of Mecklenburg-Vorpommern, and conversations with officials of the land and of two universities, and with several researchers in the universities and in other research organizations. Opinions expressed are those of the people visited except where otherwise indicated. Most of the visits were made with the Science Counselor of the American Embassy in Bonn, Mr. Frank Kinnelly, whose office also made the arrangements which made this trip possible.

This institute is the successor to an institute of the Academy of Sciences of the former German Democratic Republic (DDR). It was a branch for theoretical and experimental research of the Central Institute for Electron Physics in Berlin. Its Director today is Prof. Dr. R. Winkler. After the recent evaluation by the Wissenschaftsrat [Science Council], this institute will expand its scope to include some of the work formerly done in Berlin. The Institute today is one of the "blue list" institutes, with 50% support from the land, and 50% from the federal Ministry of Research and Technology (BMFT=FMRT). The budget is DM6 million [about \$3.9 million] for this year. There are 60 people in the Institute, of whom about 25 are physicists, plus engineers and technicians. Fifty of these are covered by the basic budget, and the others are funded by specific grants from BMFT and the Deutsche Forschungsgemeinschaft (DFG). At this point, staff is still being recruited, and people being transferred from Berlin (some of whom are having trouble finding housing) are still arriving.

The institute today is working on several lines of research:

- Theory of Anisothermal Low-temperature Plasmas
- Strong-coupled Plasmas
- Low Pressure Plasma Processing
- Application of Theory
- Force Fields
- Irradiation from Isothermal Plasmas

The research on strongly coupled plasmas is between classical plasma physics (density-related) and solid state physics (heat-

related). There are important theoretical as well as experimental aspects to this research, some of which is very important in astrophysics. Work on high energy, high density plasmas is related to work at Lawrence Livermore, Los Alamos and Chelyabinsk. Experimental work includes on ballistic compressors, electrical discharge in plasmas, and measurement of electrical and optical properties of plasmas. Models of plasmas are prepared, compared to experimental findings and reconfigured.

Low-pressure plasma processing work concentrates on the use of plasmas for surface modification of materials, including thin film deposition, surface activation and cleaning. Experiments on plasma polymerization and diamond deposition are yielding information on control processes in plasmas. Other work is focussed on diagnostics - elimination of distortion in high resolution spectroscopy on molecules and radicals - and on mean electron distribution functions in plasmas. Mass spectrometry (of neutral particles and ions) and high resolution mass spectrometry (in establishing ionization cross sections for new molecules) are extensively employed in the work of this group. The ionization cross section work is the basis for a proposal for support from NATO, in cooperation with the Physics Department of Greifswald University. Microwave, RF discharge and beam plasma discharge devices are used to help produce new materials.

Force field research concentrates on various discharge types, such as isolated electrodes discharges (as in computers) and low pressure rare gas discharges (as in fluorescent tubes). Studies of both ultraviolet and far ultraviolet radiation are underway, with possible application to environmental protection.

The theory group provides theoretical descriptions of phenomena such as low-temperature anisothermal plasmas. In these plasmas the electron component is very hot - 1,000 times hotter than the ion component. Questions related to the transfer of energy and the kinetics of the electron component are examined and described from various points of view. The theoretical work describes both static and dynamic conditions, and then attempts to provide an integrated description, taking into account factors such as external parameters, working gases and others to determine internal parameters. The work includes both basic research and explanations applied to existing devices on the market.

The Institute has a variety of experimental apparatus and instrumentation, including for thin film deposition and the ability to produce planar microwave plasmas of large area capable of treating large substrates. Growth rates of 1 mm/hr. are possible, at high pressure and temperature (2 kiloPascal at 800 to 900°C). There is also a scanning-electron microscope.



**NSF/EUROPE Comment:** This institute is located in what looks like a nice residential neighborhood of Greifswald. Its workplan is accommodating to its new status, its new staff and newly-available equipment. There is historically a good connection and working relationship, including co-authored research papers, between this institute and the University of Greifswald Department of Physics. The new leadership is open to collaboration and cooperation with American researchers, and has already established some connections to CUNY and the University of Illinois. The aim is clearly to keep Greifswald known for high quality research in Low Temperature Plasma Physics.

{end of description #023}

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**#024: Institute for Surface Modification Leipzig**  
Institut für Oberflächenmodifizierung Leipzig  
Permoser Straße 15  
D/O-7050 Leipzig  
Telephone: +49 (341) 2392-2308  
Telefax: +40 (341) 2392-2313

Director of Foundation Committee: Prof. Bethge  
Founding Director: Prof. Dr. F. Bigl  
Admin. Leader: Frau V. Zellin  
Employees: 60, among them 24 scientists

**#024\*K3JAN92\* Institute for Surface Modification**

**Research objectives:**

- Basic research in the area of non-thermal material changes and use of material
- Application oriented basic research regarding interaction of radiation with matter
- Investigation of mechanisms of ray-induced reactions
- Defining the mechanisms in caustic and separation processes and technological application of knowledge gained
- Improvement of the procedure techniques including the development of efficient broad band radiation
- Investigation and characterization of material changes with electron- and gamma rays
- Investigation of the mechanisms of polymerization and the definition of the reaction process with the help of pulse radio and spectroscopic methods
- Chemical modification by rays of polymers in order to raise their heat resistance and production of non-flammable foam materials
- Sensibilization of "strahlenchemischer Vernetzung" of polymers
- Structuring and treatment of planes through ion and laser stimulation processes

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- Investigation of the interaction of low energy ions with solid state surfaces
- Investigation of ion beam processes for the structuring of the planes with nanometer precision

{end of description of #024}

**#025: Working Group "Electro Luminescence" of the Heinrich-Hertz Institute for Communication Technology, Berlin**

Arbeitsgruppe "Elektro-Lumineszenz" des Heinrich-Hertz Institutes für Nachrichtentechnik, Berlin

Hausvogtei Platz 5-7

D/O-1086 Berlin

Telephone: +49 (30) 2037-7326

Telefax: +49 (30) 238-4527

Employees: 12, among them 6 scientists

**#025\*K3JAN92\* Working Group "Electro Luminescence" of the Heinrich-Hertz Institute**

Research objectives:

- Basic material research of EL-systems
- Development of the technology for the production of surface EL displays

**#026: Institute for Plant Genetics**

Institut für Pflanzengenetik

Correns Straße 3

D/O-4325 Gatersleben

Telephone: +49 (39482) 50

Telefax: +49 (39482) 280

Manager: Prof.Dr.U.Wobus

Admin.Leader: Herr B. Eise

Employees: 306, among them 91 scientists

Gatersleben is a small town in the land Sachsen-Anhalt, about 40 km southwest of Magdeburg.

**#026\*K3JAN92\* Institute for Plant Genetics**

Research objectives:

- Development of gene transfer techniques for cultivated plants
- Molecular mechanisms of seed protein formation
- Regulated gene expression of bacillus and yeast as the basis for micro-biological product formation
- Molecular plant virology for the production of virus resistant cultured plants
- Plant cytogenetic and mutation mechanisms

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- Molecular mechanisms for the regulation of autotrophic plant material change processes for photosynthesis and mineral nourishment
  - Resource research
- (The organization of research tasks in the way of special focal points of research will be discussed by the founding committee.)

[Description for #026 Continued Next Page]

**#026\*02OCT91\*** Our host at the Institute for Plant Research and Genetics at Gatersleben was Prof. U.Wobus. The institute, located about 5 miles from Quedlinburg, was visited on 21 October. The institute was founded in 1943 by Dr.H.Stube and moved to the present site in 1944. The primary mission of the institute was to serve as repository of over 60,000 cereal grains (gene bank for cereals). The institute also had a mission to examine the health status of industrial workers in the GDR; this was a consequence of the genetics strength of the institute. The primary component of the screening was examination of cells from subjects to identify chromosomal structural abnormalities. The research program of Dr.Wobus relates to the production of seed storage protein, the primary amino acid sequence of these proteins, and the relation between seed storage production and carbohydrate metabolism in plants. Among the grains investigated are barley and rye. Current funding by the FMRT supports the gene bank activities of the Center. There is a joint project between Gatersleben and Purdue University related to seed storage proteins. The physical plant of the Gatersleben Institute is well maintained and could function as a Research Park with emphasis on plant biotechnology.

{end of description #026}

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**#027: Institute for Plant Biochemistry**

Institut für Pflanzenbiochemie

Weinberg 3

D/O-4050 Halle (Saale)

Telephone: +49 (345) 601312

Telefax: +49 (345) 651649

Director (acting): Prof.Dr.Benno Parthier

Employees: 130, among them 50 scientists

**#027\*K3JAN92\* Institute for Plant Biochemistry**

Research objectives:

- Chemistry of natural products
- Hormonal research of plants
- Stress research of plants

(The organization of research tasks in the way of focus on specific research will be discussed by the founding committee.)

#027\*NJUL91\* NSF Europe Report No.33, 18 July 1991:  
Institute of Plant Biochemistry, Halle (Saale), Germany.

This report is one of several pertaining to a visit to Leipzig, Halle and Dresden, Germany July 9-11, 1991. These visits took place with the assistance of the American Embassy, Bonn and the American Consulate-General, Leipzig. Mr. Frank Kinnelly, Science Counsellor in Bonn and/or Mr. Nicholas Dean, Vice Consul in Leipzig, were co-participants in the meetings and provided important background information and logistical support. Except where otherwise indicated, the opinions expressed are those of the persons visited - as understood by the drafter.

Dr. B. Parthier is the Director of the Institute of Plant Biochemistry. The institute was founded in 1958 by Kurt Motus, a plant physiologist and biochemist who was an active organizer of science in the former German Democratic Republic (DDR=GDR). Within the conditions for science available in the GDR, the institute has maintained a high level of research. The first institute in the GDR specializing in biochemistry of plants, it originally specialized in the biochemistry of natural products and the physiology and biochemistry of plant hormones. Today, there are three departments:

- Stress Research, including stress responses in plants and techniques for inducing stress resistance/tolerance.
- Plant Hormones, including physiology and biochemistry research and molecular biology of plant hormones.
- Natural Products Chemistry.

The institute currently has 150 people, of whom 60-70 are researchers. The institute staff gives lectures at the Martin Luther University, and there are about ten students at work in the institute. Like other institutes of the former Academy of Sciences of the GDR, the federal Science Council (Wissenschaftsrat) has conducted an evaluation of the institute's work. While the review was quite positive, the final changes which will come from the evaluation are not yet known. However, the organization and the personnel will change - probably drastically - and staff will be reduced.

Hormone research at the institute focusses on endogenous systems to regulate growth and development of the plant. A group of compounds related to prostaglandins - possibly a new group, the jasmonates - are being investigated. These have strong interactions with other hormones, and may affect growth and development processes. These compounds, which have also been found in fungi, may also be signals involved with the response to stress.

Classical hormones like gibberellins are also studied, and can be prepared in a biotechnology process using fungi. The institute has a long-standing cooperation with industry in gibberellins

research. Hopefully, the jasmonate research will be able to continue under the institute's new organizational structure - especially because it may be connected to stress induced by environmental problems.

Stress research focusses on basic and applied studies on plant protection mechanisms, by biological rather than chemical means. Working with the local chemical industry in Halle [hard-hit by the imposition of West German environmental standards in the new länder of the east], the institute is working on agrichemicals which are not toxic but which increase plant resistance.

Additional work has been undertaken on the response of the cell at the molecular level to various stresses, including heat and heavy metals. In both cases, there are cell structure changes and protein metabolism changes. While there is a drastic reduction of normal protein synthesis under stress, some large proteins (heat-shock granules or jasmonate-shock proteins) are produced in greater numbers, possibly to use as transport for other proteins. The regulatory mechanisms involved in the uptake of stress is another important line of research.

Chemistry of natural products research has included work on new pathways for the biosynthesis of alkaloids, structural elucidation of natural products from plants, microorganisms and animals and chemical approaches of natural compounds used for drugs or pesticides. The institute has been able to determine the derivation and pharmacological activity for ergot alkaloids but industry was not able to transfer the scientific results into practice or products. It has isolated nicotinamide, important in the metabolism and transport of iron in plants, and developed conjugates of gibberellins, amino acids and sugars important in hormone production.

While the institute has used some arabidopsis mutants in its jasmonic acid response and regulatory function work, it is not doing any work on the arabidopsis genome.

**NSF/EUROPE Comment:** The Institute of Plant Biochemistry is located in a rambling building on a large campus adjacent to the Institute for Solid State Physics and Electron Microscopy and near the science faculties of the Martin Luther University in Halle. It has biochemistry laboratories which seem reasonably well-equipped, including with facilities for separation and purification of hormones. Four or six people are assigned to each. While there is high-performance liquid chromatography available, there is no gas liquid chromatography. There is a chemistry laboratory with gas chromatography and mass spectrometry, a Carbon-14 isotope laboratory, and a thin-layer preparation facility, liquid scintillation counter, several centrifuges, cold rooms (including

one with a large fungi collection and an electron microscope. The most modern equipment was acquired during the past year but there seems to be a considerable amount of that.

The institute staff has cooperated in the past with researchers in the United States, including at Purdue, the University of Washington, UCLA, and Michigan State University. Further cooperation is hoped for with these groups, and it is hoped that additional connections with American researchers can be developed in coming months.

**#027\*Q5OCT91\* INSTITUTE OF PLANT BIOCHEMISTRY (partial questionnaire)**

**1. GENERAL SURVEY**

1.1. Address, Telephone etc.: see above

1.2. Setting, Environment, Access:

Situated in the Halle campus of the science faculties of the Martin-Luther University Halle-Wittenberg, near the Institute for Solid State Physics and Electron Microscopy in Halle-West at Heideweg. Streetcar 4, 9, 13 stop Weinbergweg;; from Main RR Station for about 40 minutes, possibly change required (street-car routes are changing).

1.3. Organization, Structure, Hierarchy:

Blue List Institute. Three departments:

- Stress Research, including stress responses in plants and techniques for inducing stress resistance/tolerance.
- Plant Hormones, including physiology and biochemistry research and molecular biology of plant hormones.
- Natural Products Chemistry.

1.4. Employees:

About 150 employees of whom 60-70 are researchers. About ten students of the Halle-Wittenberg University work at the Institute. It is probable that the staff will be reduced (see below under 4).

**2. HISTORY**

2.1. Long Term History, Founding, Tradition:

Founded in 1958 by Kurt Motus, a plant physiologist and biochemist. It was the first institute in the former GDR in the biochemistry of plants, it originally specialized in the biochemistry of natural products and the ophysiology and biochemistry of plant hormones.

2.2 .Recent History, (see also below under 4):

Most modern equipment was acquired within the last two years or so, but it has been stated that there is a considerable amount of it now available.

### 3. RESEARCH

3.1. General areas Covered: see the departments listed under 1.3.:  
- Stress research focusses on basic and applied studies on plant protection mechanisms, by biological rather than chemical means. Working with the local chemical industry in Halle (see below under 4.2), the institute is working on agrichemicals which are not toxic but which increase plant resistance. Additional work has been undertaken on the response of the cell at the molecular level to various stresses, including heat and heavy metals. In both cases, there are cell structure changes and protein metabolism changes. While there is a drastic reduction of normal protein synthesis under stress, some large proteins (heat-shock granules or jasmonate-shock proteins) are produced in greater numbers, possibly to use as transport for other proteins. The regulatory mechanisms involved in the uptake of stress is another important line of research.

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Chemistry of natural products research has included work on new pathways for the biosynthesis of alkaloids, structural elucidation of natural products from plants, microorganisms and animals and chemical approaches of natural compounds used for drugs or pesticides. The institute has been able to determine the derivation and pharmacological activity for ergot alkaloids but industry was not able to transfer the scientific results into practice or products. It has isolated nicotinamide, important in the metabolism and transport of iron in plants, and developed conjugates of gibberellins, amino acids and sugars important in hormone production. (While the institute has used some arabidopsis mutants in its jasmonic acid response and regulatory function work, it is not doing any work on the arabidopsis genome).

### 3.2. Specific Scientific Activities:

The institute has biochemistry laboratories (reasonably well equipped) including facilities for separation and purification of hormones (four or six people are assigned to each). While there is



high-performance liquid chromatography available, there is no gas-liquid chromatography. There is a chemistry laboratory with gas chromatography and mass spectrometry, a carbon-14 isotope laboratory, a thin layer preparation facility, liquid scintillation counter, several centrifuges, cold rooms (including one with a large fungi collection) and an electron microscope.

#### 4. GERMAN UNIFICATION, TRANSITION

##### 4.1 Wissenschaftsrat (Science Council):

Wissenschaftsrat has investigated and gave a positive comment, but the final consequences are not yet determined.

##### 4.2. Special Problems of an Administrative Character:

The chemical industry in the Halle area was severely hit by the introduction of West-German environmental standards, this had repercussions for the collaboration of the Institute with that industry.

##### 4.3. International Contacts:

The institute staff has cooperated in the past with researchers in the USA, including PURDUE, U/WA, UCLA, Michigan State. It is hoped that this can be continued and possibly expanded to other points.

{end of description #027}

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#### #028: Institute for Crystal Cultivation

Institut für Kristallzüchtung  
Rudower Chaussee 6  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-2893  
Telefax: +49 (30) 6704-5921

Director: Dr.W.Schröder  
Admin.Leader:J.Warnecke  
Employees: 52, among them 26 scientists

#### #028\*K3JAN92\* Institute for Crystal Cultivation

##### Research objectives:

Basic and applied research for the cultivation and characterization of crystalline work material, as well as the development of procedures and establishments as needed for modern technology and information technique (microelectronic, Photonics), power electronic, photovoltaic and sensory analysis. It is aimed at combining the development of procedures and establishment. Processes of cultivation involve volume crystal cultivation and selected processes for a separation of layers.

The Institute for Crystal Cultivation will meet the need for the future supply of public universities, research institutes and smaller industrial establishments by supplying them with special crystals of high quality. For this purpose the development of growth technologies should be extended to compounds which have not been made up to now. The methods for the characterization of crystals should be supplemented accordingly.

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**#029: Institute for Semiconductor Physics**

Institut für Halbleiterphysik  
Walter-Korsing Straße 2  
D/O-1200 Frankfurt (Oder)  
Telephone: +49 (335) 373-0 or 373-220  
Telefax: +49 (335) 326-195

Scientific Director: Prof.Dr.Hermann Georg Grimmeis  
Administrative Director:Dr.Grenz  
Employees: 150, among them 65 scientists

**#029\*K3JAN92\* Institute for Semi-Conductor Physics**

**Research objectives:**

In its review of 5 July 1991 the scientific council recommended that the research emphasis of the new Institute for Semi-Conductor Physics (IHP) in Frankfurt/Oder should be on a research oriented FuE-program as the basis for innovative developments in the Silicon-technique, at the same time demonstrating the realization of new concepts in the production of special building elements and microsystems. Moreover, it is recommended to intensify the relation between application oriented basic research and technology oriented research as well as semi-conductor processes.

**#029\*I1990\* Institute for Semiconductor Physics**

**Research Program**

The Institute of Semiconductor Physics with more than 120 graduated scientists are engaged in basic and applied research on silicon semiconductor physics and technology within national research programs and on the basis of contracts with institutions and enterprises of the national microelectronic industry.

Its main task is basic research on:

- \* device physics (incl. modelling and simulation)
- \* microlithography
- \* physics of thin layer formation
- \* material research and defect engineering
- \* semiconductor wafer processing.

The hereby obtained scientific results and the accompanying innovations have become very important for:

- \* the development and testing of progressive silicon device processing technologies, such as nSGT, CMOS, BICMOS or SOI;
- \* the development and probing of technological steps and methods for submicron - and advanced uni - or bipolar technologies (lithography, etching, silicide film formation, oxidation, annealing, etc.);
- \* the scientific penetration in the interactions between substrate material-technological process and device parameters incl. defect engineering;
- \* the development of methods for substrate processing technology;
- \* the application of device - and process-simulators for device and process modelling and simulation;
- \* the prototyping of special microelectronic devices, sensors, detectors etc. and the development of special measuring and diagnostic methods.

The basis of the experimental investigations is a variable 1, 5  $\mu\text{m}$  CMOS-/BICMOS-pilot line and a special crystal processing laboratory.

**Four industrial applications were offered:**

- \* prototypes of CMOS-/BICMOS devices, silicon sensors, charged coupled devices, silicon detectors;
- \* small quantities of high efficient silicon wafers based on special wafer processing as SOI or VDI-technologies;
- \* prototypes of equipments, necessary for analysis, diagnostic, measuring and testing.

**#029\*Q4OCT91\*** INSTITUTE OF SEMICONDUCTOR PHYSICS (Questionnaire on..)

**1. GENERAL SURVEY**

1.1. Address, Telephone etc.: see above

1.2. Setting, Environment, Access:

The Walter-Korsing-Straße runs north-south parallel to, and close to, the "Alte Oder", a branch of the Oder river, due east of the railroad station Frankfurt/Oder. The institute is a rather large and rather new building near the northern end of the street. When approaching Frankfurt on the autobahn from Berlin, care must be taken not to be misled over the Oder bridge and entering Poland.

**1.3. Organization, Structure, Hierarchy:**

This institute is intended to become an institute of the "Blue List", i.e. supported by the Federal Republic and the State of Brandenburg, about 50:50%; in the legal form of a company "GmbH" (about "Ltd.").

Director: Prof.Dr. Grimmeiss (from the University of Lund in Sweden).

The inner structure does not seem to be quite clear yet.  
"Fachbereiche" (Topic Areas) could be (1) Materialwissenschaften (Material Diagnostics), and (2) Halbleiter-Bau-Elemente, Mikrosysteme (Semiconductor composition elements, microsystems).

#### 1.4. Employees:

After 01 Jan 92 estimated 150 employees of which number 120 are scientists.

#### 1.5. Institute Publications; Host Conferences:

Every two years in the autumn an international meeting "GADEST" = Gettering and Defect Engineering in Semiconductor Technology hosted by institute with voluminous proceedings edited.

The institute conducts seminars on related technologies.

There exists a number of descriptions of special capabilities offered as services to others (these descriptions are either in German or in English), for example on: Phase-shift Mask Technology for 250 nm Feature Size; Nanostructure Technology; Nuclear Radiation Detectors; Surface-Imaging-Resists for sub 250 nm; Simulation of Etching; Photo-Lithography.

## 2. HISTORY

### 2.1. Long Term History, Founding, Tradition:

Founded 1983 in Frankfurt/Oder. There are 500 square meter working area in the new building.

Cooperation with 22 research institutes in nine countries.

### 2.2 .Recent History (see also below under 4):

International exchange of information, special contacts to Research Center of Microelectronics in Dresden (Details see blue brochure "Forschen für die Mikroelektronik")

## 3. RESEARCH

### 3.1. General areas Covered:

Basic and applied research on silicon semiconductor physics and technology. Its main task is basic research on Device Physics, Microlithography, Physics of thin layer formation, Material research and defect engineering, Semiconductor wafer processing.

### 3.2. Specific Scientific Activities:

The institute covered and hopes to cover in future the whole spectrum from basic research to the prototype of a new composition element. According to the opinion of the colleagues at this

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institute, this principle is only obtained (outside of this institute) by IMEC in Belgium but by nobody else, at least not to the same degree.

Scientists at the institute reason that there is so much known about silicium as a semiconductor that the attempt to further improve its capabilities is more promising than to abandon this material and to switch fully to, for example, Ga-As, including light emission and other optoelectronic capabilities.

### 3.3. Problems Being Worked on after 01 January 1992:

Development and probing of technological steps and methods for sub-micrometer technologies especially for industrial applications (lithography, plasma etching, cleaning, gettering, deposition processes, recrystallization for SOI, VDI).

Defect engineering and special diagnostics (intrinsic and extrinsic gettering technics, crystal and material diagnostics).

Development and probing of nSGT, CMOS and BiMOS technologies.  
Standard: 1.5  $\mu\text{m}$  CMOS/BiCMOS for 4-inch wafers.

Development of methods or substrate production and preparation for 1 to 6 inch wafers.

Design and preparation of test structures, prototypes and special IC's (CCD-sensors, Hall elements, detectors and memories).

Device and process simulation of submicron elements, memories and transistors.

Application of process simulators for technological runs, modelling and simulating of technological steps (lithography, silicide film formation, oxidation and annealing).

Development of measuring methods (contactless measurement of electrical parameters, complex CV-measurement and calculation, F-Q(t) and GRD-measurement).

Production of scientific instruments and accessories (measurement systems and technological environments).

The basis of the experimental investigations is a variable 1.5  $\mu\text{m}$  CMOS/BiCMOS-pilot line and a special crystal processing laboratory.

#### 4. GERMAN UNIFICATION, TRANSITION

The first session of the Gründungskommission (Founding Commission for the new institute) took place on 02 October 1991 - during our visit - the Minister for Science and Research (Dr. Enderlein) of the State of Brandenburg and his Department Head for Research (Dr. Faber) attending. Also, Prof. Grimmeiss was there and we met him.

##### 4.2. Special Problems of an Administrative Character:

In the opinion of the colleagues interviewed, what they are lacking is knowledge and experience in two fields, called by them "Forschungs-Management" and "Forschungs-Marketing" (Management of Research and Marketing of Research) because in their former environment such activities did not exist.

They seem to highly approve the fact that TEXAS INSTRUMENTS - and only this one American company and some Japanese - maintains research centers in Europe.

The termination of ROBOTRON causes problems which in a short time could become very severe because their computer system may give up its life.

##### 4.3. International Contacts:

Prof. D.K. Schroeder (Arizona State University, Tempe, AZ) seems to be a close contact but there are many others. The hosting of the bi-annual GADEST Conference almost guarantees the continuation of such contacts.

They did suffer from the embargo against export of certain instruments to East-Block countries, enforced by the West-German customs officials.

##### 4.4. Scientific Problems Abandoned after 01 Jan. 92

Less a scientific problem than an offer for industrial applications by the (former Academy of Science) institute were:

Prototypes of CMOS-/BiCMOS devices, silicon sensors, charged coupled devices, silicon detectors;

Small quantities of highly efficient silicon wafers based on special wafer processing as SOI or VDI technologies.

Prototypes of equipment, necessary for analysis, diagnostics, measuring and testing.

##### 4.5. Released Scientists:

On 01 January 1992 the number of employees shrinks from about 320 to 150. Some of them can be employed by soft money ("Dritt-Mittel") at least for some time: the institute offers to regional industry and others certain research efforts, especially those which were part of the program of the old institute but are no longer in the new one, but still may be needed by the outside. The newly (on 06 Sept. 1991) refounded University in Frankfurt/Oder (as "European University Viadrina", Founding Rector Prof. Dr. Knut Ipsen, address: Am Forum 1: D/0-1200 Frankfurt/Oder) will not be able to absorb any

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because it will last about five years or more before the natural sciences will become a branch of it (at present, jurisprudence and humanities are part of the university program).

5. SPECIFIC PROBLEMS, POTENTIAL ONR EUROPE SUPPORT etc.

We were asked whether ONR Europe could support a study trip to find contacts un the U.S. from whom they could learn about management and marketing of research.

{end of description #029}

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**#031: Institute for Baltic Sea Research**

Institut für Ostseeforschung

See Straße 15

D/O-2530 Warnemünde

Telephone: +49 (381) 58-0 or 58-288

Telefax: +49 (381) 58-336

Founding Director: Prof.Dr.G.Hempel

Admin.Leader: Herr B.Ulrich

Employees: 127, among them 68 scientists

**#031\*K3JAN92\* Institute for Baltic Sea Research**

Research objectives:

Based on the recommendations of The Science Council to receive their final form by the founding committee, the emphasis of research will be on

- The Baltic Sea and its ecology  
(essentially, three dimensional circulation model of the Baltic Sea)
- Mapping of sedimentary cover, accounting of the content
- Monitoring of the Baltic Sea, to include the biological monitoring for the Federal Republic of Germany
- The development of measuring equipment tuned to the research program
- Participation in bottom (ground) research
- Participation in expeditions in oceans outside the Baltic Sea
- In the frame of Baltic Sea Research a strong orientation towards the Scandinavian countries and other nations bordering on the Baltic Sea.

**#031\*03JUL91\* Institute for Baltic Sea Research at Warnemünde**

Summary: This report is a summary of a visit to the Institut, during this period of change in former East German research institutions, and it includes an in depth discussion of the activities in physical oceanography and instrumentation development.

Author: John P. Dugan.

Text:

### Introduction

The Institut für Meereskunde der Universität Rostock (Institute of Marine Research of the Rostock University) was the leading oceanographic research institution in East Germany before the reunification of the two Germanies in the summer of 1990. It is located on the Baltic Sea in Warnemünde, a coastal suburb of the seaport and shipbuilding city of Rostock. As a result of the current plans for realignment of all German research institutions after reunification, this one will change its name to Institut für Ostseeforschung an der Universität Rostock (Institute for Baltic Sea Research at the Rostock University), and its focus will change to research and monitoring of the Baltic. This important change will focus the work on the Baltic instead of the previous charter which enabled considerable open ocean work in addition to work in the Baltic. The purpose of this change is to remove duplication with other German oceanographic research institutions.

This report is a result of a one-day visit by the author and CAPT Paul Gaffney, Commanding Officer of NRL, and it provides an overall review of its activities with specific comments on physical oceanographic work.

### Facilities

The Institut is housed in a single building of undistinguished architecture built in 1966 to include offices and laboratories. It is, however, very close to a beautiful beach and only several blocks from the very active harbor. The Institut was established from several smaller groups in 1958 to be the lead oceanographic research institution of the Academy of Sciences of the former German Democratic Republic. It was funded on a sustaining basis by the government, with research toward both military and non-military applications. In that form, it grew to a size of about 150 people performing general oceanographic research, instrumentation development, and oceanographic surveys.

The major facilities of the Institut, in addition to the building, are two research vessels. The *A.v.Humboldt* was built in 1967 (rebuilt in 1978) and displaces 1275 tons and accommodates 13 scientists. The *Prof. Albrecht Penck* was built in 1951 and displaces 310 tons and accommodates 10 scientists. The larger ship has undertaken cruises throughout the ocean, including the tropical Atlantic and Indian Oceans, while the latter has been restricted to the Baltic. Both have the expected facilities, including hydrographic and deep sea winches, navigation aids (SatNav, GPS), echo sounders, and laboratories. Unfortunately, they were at sea and therefore unavailable during the visit. One surprising aspect is that the ships are operated solely by the Institut for use by their own personnel. The crews currently are employees, although



this is expected to change to a contractual basis more like research vessel operations in the West.

### Publications

The Institut supports a journal entitled *Contributions to Marine Scientific Research*, with papers accepted in German, English, or Russian. It operates much like many other academic journals. Although open to all researchers in marine sciences, most papers are contributed, not surprisingly, by members of the staff. The journal appears aperiodically, and is now in its 70th issue. It is professionally printed and most but not all papers are in German. The authors are fully apprised of references in the field in Western scientific journals, although many of the journals were not previously available directly at the Institut.

The Institut also has a publication called *Marine Scientific Reports*. These are much more detailed reports of analyses, and most of those examined include numerous plots of data. They are comparable in quality to NRL Formal Reports, which is to say scholarly, but providing much more detail than is appropriate for most academic journals.

### Organization

The Institut is organized into a number of departments. There are the usual disciplines in Area I and II, namely physics, biology, and chemistry. These are separate from a technology department, which is responsible for instrumentation, and an observational department for computers and data analysis. It is significant that work associated with the ocean bottom is outside these Area departments. The Director of the Institut is Prof. Dr. Dieter Lange, whose background is in geology, and he has worked on the Western Baltic. The Physical Dynamics Group is headed by Prof. Dr. Hans Brosin, whose work has been in various aspects of remote sensing of the ocean. Additional physical groups include theoretical, observational, and a small microstructure group. The G&G group is headed by Lange. The instrumentation by Striggow, Bio & Chem by Nehring.

### Theoretical Physical Oceanography

The theoretical group is headed by Dr. Wolfgang Fennel who has written a book entitled *Analytical Theory of Forced Oceanic Waves*, in collaboration with Dr. Hans Ulrich Lass and published by Akademie-Verlag in Berlin. This book, published in 1989, is primarily concerned with the linear response of simplified oceans to wind stress. It uses the Green's function approach which permits the solution of more complicated problems by superposition of these analytical functions. They argue that analytical theory is important to complement the more typical numerical modeling because it more clearly establishes the underlying physical

principles. Also, theory may be used to provide exact solutions with which to check numerical results. Even in applications in which nonlinear terms are important in the governing equations, linear features often persist into the nonlinear range, and the theory can provide some physical insight. This book is more recent than the book *Waves in the Ocean* by LeBlond and Mysak, and it specializes on particular solutions forced by wind stress as opposed to LeBlond and Mysak's emphasis on freely propagating waves. It is clearly written in English, but it has not had wide advertisement nor wide distribution because of limitations of the publisher. Also, it purportedly took more than three years to produce. Finally, the references are almost entirely to Western literature, and they are reasonably complete up to 1985, about the time the book was completed.

The emphasis of this group on theoretical work, though, has to be based upon the fact that, until the very recent past, appropriate computers were not available in East Germany. With the advent of access to computers, this group has more recently implemented numerical models. An example they are proud to discuss is a response model of the Western Baltic which has very detailed bathymetry. The model is an adaptation of the well-known (but now decade old) Bryan-Cox model, and it is implemented on a 486 which was the fastest machine in evidence. The model including the code was obtained from Dr. Kirk Bryan (at the NOAA Geophysical Fluid dynamics Laboratory in Princeton) and adapted locally to the Baltic. Much of the auxiliary software for plotting and the like is commercially available in the West.

#### Observational Physical Oceanography and Instrumentation

With two full-time ships, observational work has dominated the physical sciences in the Institut. Physical properties of the water column are usually measured with a conductivity-temperature-depth (CTD) profiler which is lowered through the water column by cable from the research vessel. The Institut has three of these instruments which have been used to obtain a very completed hydrographic series of temperature, salinity, density, and sound velocity measurements in the western Baltic.

The instruments, remarkably, have been designed, built, and maintained entirely by the engineering staff of the Institut. This has occurred because of the previous unavailability of individual components as well as entire units from suppliers. All sensors are similar to Western ones, although the conductivity sensor uses the principle of induction rather than the more usual direct contact resistance principle as in the Neil Brown or Sea-Bird sensors. The workmanship is excellent, and unusual care seems to have been applied to maintenance of calibration standards.

The concern with calibrations has led this group to include a sing-around sound velocity sensor to their instrument. This provides a redundant measurement which is used in all data

processing to maintain a check on the calibrations of the sensors. This is accomplished by computing the sound velocity from temperature, salinity, and depth measurements (as done almost entirely in the West), and comparing the result with the directly measured sound velocity. Any sudden and unexpected change in this comparison indicates a problem with one or more of the sensors in the instrument. It is not clear whether this is an exhibit of extra care on their part, or only that there have been sensor problems in the past.

There is a small Physical Oceanography Group, led by Dr. Hartmut Prandke, which makes observations of turbulence in the thermocline and in the bottom boundary layer. The group has developed its own free fall profiler completely from scratch. The profiler is similar to early U.S. technology of order ten years ago, providing vertical profiles of very small scale fluctuations. The first instrument was constructed in 1980 with only one channel each of temperature and micro conductivity. This was later modified to provide some simultaneous horizontal structure (dropped horizontal coherence in physical oceanography terminology) by having several sensors separated horizontally by distances from 1 mm to 2 m. A newer generation instrument was developed in 1986 called the MSS 86, having eight channels of data digitized and transmitted up the cable at 1 kHz rate. This sensor incorporates two micro-scale airfoil velocity sensors visually similar to those typically used in western profilers. They do not yet have the present capability of measuring larger scale velocity gradients, as in the University of Washington Multi-Scale Profiler of Gregg and Sanford. Thus, though they can estimate the kinetic energy dissipation rate, they cannot yet measure the velocity profile to estimate the local Richardson number.

The currently used instrument includes micro-temperature, conductivity, velocity, and turbidity sensors. It has an interesting computer controlled winch which manages payout of the cable. This permits the instrument to free-fall while it is loosely tethered. When it reaches the bottom of the cast, it is winched up in preparation for the next profile. The overall instrument technology is a few years behind the best in the West but, considering the effort required to design, build, and maintain such instrumentation without modern facilities and availability of components, it must be expected to catch up very quickly.

The research is directed toward an understanding of turbulence processes with two applications. There is interest in the bottom boundary layer, including the entrainment and transport of sediments. This is an interesting application of the instrumentation, but there is no concurrent work from bottom mounted instrumentation frames like that in the West. The second application is sound scattering layers due to the thermal microstructure, and this has resulted in a number of papers on this effect by Drs. Prandke and Stips. They conclude that the bulk of

the scattering is from micro-bubbles generated by decaying organic matter suspended in the strong gradients in the thermocline.

#### Geology and Geophysics

In addition to the fine grid of physical oceanography data obtained in the Western Baltic, the Institut has a very fine survey grid of bottom measurements. These data include echosounder recordings and many bottom core samples. The work has resulted in a number of very nicely produced charts of the bottom properties. Dr. J. Andrews of ONR Europe has remarked on the quality of these charts, and Dr. P. Vogt of NRL plans a trip to evaluate them in more detail.

#### Final Note

This Institut is undergoing a massive and disruptive change at the moment. They have received a positive review as a result of the recent Wissenschaftsrat review, they will reorganize and continue as a viable institute, and will be receiving funding from the FRG and the local state government. However, Drs. Lange and Brosin could not be specific about what work will continue and what will not. They have recently reduced staff, and expect some further reduction in the near future. Environmental monitoring work in the Baltic will grow over the next few years, and will involve the order of 30 staff members, probably requiring an increased emphasis in Marine Chemistry and Biology. However, this necessarily must involve mostly survey work, and the impact on the number and type of personnel was not clear to us.

The technical personnel that were interviewed during our visit were very sharp, and reasonably up on technology in the West. They clearly were good scientists whose work, unfortunately, was hindered by the need to build too many fundamental components of their instruments, and the lack of computer technology in particular. The technical personnel are not versed in how to sell their research in a competitive research environment, and it will be interesting to see how this Institut adapts to the Western way of doing science over the next several years.

Both CAPT Gaffney and myself gave presentations to an assembled staff of about 35 scientists. We addressed the organization of ONR and NRL, provided some detail on U.S. Navy research ship and aircraft facilities, and discussed how research is funded and managed in U.S. institutions. They were very interested and responsive, though clearly uninformed. Both Drs. Lange and Brosin were especially interested in methods of getting exposure of their younger researchers to U.S. research institutions. If any readers are interested in receiving or providing visiting scientists, please contact the author or the Institut directly.

{end of description of #031}

**#032: Institute of Atmospheric Physics "at" the University of Rostock**

Institut für Atmosphärische Physik "an" der Universität Rostock  
Schloß Straße 4/5  
D/O-2565 Kühlungsborn  
Telephone: +49 (38293) 576 or 577  
Telefax: +49 (38293) 212

Founding Director: Prof.Dr.H.Hinzpeter  
Admin.Leader: M.Lange

**#032\*K3JAN91\* Institute for Atmospheric Physics at the University of Rostock**

**Research objectives:**

The Institute of Atmospheric Physics will study with direct and indirect methods of sounding the atmosphere from ground to beyond a height of 100 km. On the basis of these data a model of the dynamics of the atmosphere should be developed by also including the data of other research establishments.

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**#034: Ferdinand-Braun Institute for High Frequency Communication Technology and Optoelectronics**

Ferdinand-Braun Institut für Hochfrequenzkommunikationstechnik und Optoelektronik; other name: Ferdinand-Braun Institut für Höchstfrequenztechnik (FBH)  
Rudower Chaussee 5  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-5715  
Telefax: +49 (30) 6704-4525

Director (acting): Dr.Gründler  
Founding Director: Prof.Russer  
Admin.Leader: Herr Franz Klitsche  
Employees: 135, among them 58 scientists

**#034\*K3JAN92\* Ferdinand Braun Institute for High Frequency Communications Technology and Optoelectronics**

**Research objectives:**

- Industry oriented FUE in the areas:
  - GaAs-Electronics
  - Design - process - analysis
- Optoelectronics
  - Building elements/structure - process - analysis

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#035/01 - #036/01  
03 NOV 92

**#035: Institute for the Physics of the III-V Semiconductors**  
Institut für die Physik der III-V Halbleiter  
Hausvogtei Platz 5-7  
D/O-1086 Berlin

Chairman of Founding Committee: Prof.Dr.Gornik  
Founding Director: Prof.Koch  
Employees: 60, among them 25 scientists

This institute has been renamed, it is now the Paul-Drude Institute for Solid State Electronics (Paul-Drude Institut für Festkörperelektronik); see #013.

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**#036: Research Institute for Climatological Problems and Consequences**

Potsdam Institut für Klimafolgenforschung(PIK)  
Telegrafenberg  
Albert-Einstein Straße  
D/O-1561 Potsdam  
Telephone: +49 (331) 3100  
Telefax: +49 (331) 22824

Chairman of the Founding Committee: Prof.Dr.Klaus Hasselmann  
Director: Prof.Dr.Schellnhuber  
Admin.Leader: Dr.Raiser  
Employees: 39, among them 21 scientists

**#036\*K3JAN92\* Research Institute for Climatological Problems and Consequences**

Research objectives:

- Studies of global climatic changes on regional level using models of climatological and ecosystems methods
- Concentration of the theoretical methodological studies and research of climatological changes on the hydrological circulation, the vegetation and the perspective of socioeconomic and demographic development
- Regionalization of global climatic models
- Development of area models on typification of parameters obtained from regional analysis

Setting up a cost catalogue for the economic feasibility of measures as compared to the costs arising from a lack of measures taken.

G704W42-45

#037/01

03 NOV 92

**#037: Institute for Tropospheric Research**

Institut für Troposphärenforschung

Permoser Straße 15

D/O-7050 Leipzig

Telephone: +49 (341) 2392-2321

Telefax: +49 (341) 2361

Founding Director: Prof.Dr.Warneck

Admin.Leader: Frau Schmidt

Employees: 60, among them 23 scientists

**#037\*K3JAN92\* Institute for Tropospheric Research**

Research objectives:

The Institute for Tropospheric Research will concentrate its investigations on the heavily polluted troposphere, especially the atmospheric boundary layers. Also, by applying ground based remote sensing methods the transport of trace elements, their deposition and the processes in the formation of clouds in the troposphere should be examined. The results obtained by ground based remote sensing methods must be re-examined (e.g. through measurement made by airplanes) and simulated with numeric models.

**#037\*M6AUG92\***

{The Ministry in Dresden provided a detailed description which cannot be translated because of pressing time restrictions. Only the headlines have been translated and are given here:}

A scientific Aim:

Supporting and strengthening the meteorological research and teaching at the Leipzig University; basic research in atmospheric science.

Departments:

Physical processes in the troposphere

Chemical processes in the troposphere

Mesoscale modelling

Research Emphasis (headlines only):

Exchange between the Boundary Layer and the wind field of the troposphere covering it

Deposition of trace materials into the ecological system

Investigation of the physical and chemical properties of aerosol particles and of their effects.

G704W42-46  
#038/01  
03 NOV 92

**#038: Institute for Neurobiology**

Institut für Neurobiologie (IN)  
Brennecker Straße 2  
D/O-3090 Magdeburg  
mailing address: PSF 1860  
D/O-3010 Magdeburg  
Telephone: +49 (391) 67-4100  
Telefax: +49 (391) 67-6160

Founding Director: Prof.Dr.med.Henning Schleich  
Admin.Leader: Herr Gerd Brandt  
Employees: 100, among them 48 scientists

**#038\*K3JAN92\* Institute for Neurobiology**

Research objectives:

1. Neurophysiology
2. Neurochemistry
3. Neuromorphology

**#038\*02OCT91\*** From a report submitted by Prof.Kornguth to ONREUR: Institute for Neurobiology in Magdeburg visited on 21 October 1991. My host at the institute was Prof.Dr.Matties. Dr. Matties was the founder of this institute and has retired as the director during the past summer (1991). This institute was founded in 1981 as a section of the German Academy of Sciences and the building housing the institute was completed in 1989. The staff was recruited from the major medical school, located adjacent to the institute. The institute was planned for a research staff of 70 persons and now has 50 researchers. There were three specific areas of research in progress at the time of the visit:

- a) Neuronal plasticity-molecular tp psychophysiological aspects,
- b) Relation between the genetic and acquired properties of the central nervous system - particularly learning and memory,
- c) Blood-brain barrier - particularly as related tp environmental concerns such as lead and aluminum intoxication. The age dependent changes of the blood brain barrier are being examined.

The research teams are organized as follows:

- a) biochemistry role of fucosyl containing glycoproteins in memory formation; role of proto-oncogenes (c fos) in memory and long-term potentiation (LTP).
- b) cell physiology-role of second messengers and protein kinesis in LTP; role of protein that function as ion channels in LTP; hippocampus is the brain region examined.
- c) Psychophysiology effects of drugs and allergic status in short and long term memory.
- d) Neuropharmacology-role of brain derived materials on rapid eye movement (REM) phases of sleep.



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#038/02 - #039/01  
03 NOV 92

e) Morphology group-examination of the blood-brain barrier with regard to environmental toxins (lead and aluminum).

The investigations of the group with regard to the role of glycoproteins and lipids in memory and LTP are held in high regard by U.S. investigators.

{end of description of #038}

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**#039: Institute for Molecular Biotechnology**

Institut für molekulare Biotechnologie

Beutenberg Straße 11

D/O-6900 Jena

Telephone: +49 (3641) 85-2200

Telefax: +49 (3641) 31325

Director: Prof. Dr. Peter Schuster

Admin. Leader (acting): Dr. Horst Wagner

Employees: 180, among them 76 scientists

**#039\*K3JAN92\* Institute for Molecular Biotechnology**

Research objectives:

Development of an in-vitro procedure for structural analysis and syntheses of biological macromolecules and new processes of selection for the analysis of molecular identification processes in biology.

**#039\*02OCT91\*** From a report by Prof. Kornguth submitted to ONREUR: At the Hannover Fair I discussed the activities of the INSTITUTE OF MICROBIOLOGY AND EXPERIMENTAL THERAPEUTICS in Jena with the marketing director Dr. Horst Wagner. Their activities are concentrated on the development of sensors for biodiagnostics. Capabilities include analysis by electron tunneling, three-dimensional molecular modeling, NMR spectroscopy, encapsulation technology. A comprehensive review of the institute in Jena has been published in BIOENGINEERING FORSCHUNG UND PRAXIS, December 1990.

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**#041: Laboratory for Spectroscopical Methods of Material Analysis**

Laboratorium für Spektroskopische Methoden der Stoffanalyse (LSMS)

other name: Laboratorium für Spektroskopische Methoden der Umeltanalyti

mailing address: k

Institut für Spektrochemie

Rudower Chaussee 5

D/O-1199 Berlin-Adlershof

Telephone: +49 (30) 6704-3583

Telefax: +49 (30) 6704-3986

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#041/02  
03 NOV 92

Directors: Prof.Dr.G.Tölg; Prof.Dr.D.Klockow  
Admin.Leader: Herr Biesenbach  
Employees: 19, among these 11 scientists

**#041\*K3JAN92\* Laboratory for Spectroscopic Methods of Material Analysis**

**Research objectives:**

The laboratory will engage in basic research of element analysis aiming at a comprehensive study of the environment and environmental technology in its largest scope. As unsolved analytical questions for the protection of the environment and the preservation and improvement of the quality of life are increasing in number and complexity a solution should be found which allows for generalization. New physical principles should be examined for their analytical potentials. An essential issue of research is the reliability and availability of analytical data. The integration into ISAS provides direct access to the many methods available there; this offers the possibility to securely establish processes which have been recently developed. This will effect in particular the economy of analytical methods. The close cooperation with ISAS creates a large scientific and methodological potential which, when applied in a concentrated approach will make possible fundamental contributions to analytics. In this scope, an essential goal of analytical statements will be an investigation of how new analytical knowledge can be gained for broad general and short term application.

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**#042: Research Association Berlin**  
Forschungs-Verbund Berlin  
Jäger Straße 22/23  
D/O-1086 Berlin

PoC: Herr Falk Fabich

This is an association of Blue-List Institutes residing in Berlin. Blue-List Institutes in East-Berlin according to our information are (they may not all be members of the Forschungs-Verbund, though):

#013 (#035), #016, #020, #022, #025, #028, #034, #035 (#013).

MAIN CHAPTER 5:

FRAUNHOFER ESTABLISHMENTS AND BRANCH LABS

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contains:

- Chapter 5.1: Fraunhofer Establishments  
(Fraunhofer Einrichtungen)
- Chapter 5.2: Fraunhofer Branch Labs  
(Fraunhofer Aussenstellen)

For general information on the Fraunhofer Society see Part A of this REPORT under chapter 4.5.2.2.

The Fraunhofer Society for the Promotion of Applied Research in Munich (München) is establishing two types of institutions in the five new länder and East-Berlin:

"Fraunhofer Establishments" (this English translation for "Fraunhofer Einrichtung" was coined by the Society itself) seem to be basically similar to the "Fraunhofer Institutes" in the old FRG. Fraunhofer Institutes are expected to earn most of their money from industry; considering the present situation in the new länder this would seem to be an impractical requirement for these institutions. Obviously, these "Establishments" mostly will hope to become "Institutes" in the future.

"Fraunhofer Branch Labs" (the English again coined by the Society) are dependents of existing Fraunhofer Institutes in the old FRG. It does not seem to be decided yet whether or not all or any of them may move to the West at some time in the future, or remain where they are now.

In a more recent development (mid 1992), at least one of the East-German Fraunhofer Establishments (#048) has been combined with an existing West-German Fraunhofer Institute into a two-location institute, at present with a director in the West-German location and a contact person in the East-German one.

Chapter 5.1:

FRAUNHOFER ESTABLISHMENTS = FRAUNHOFER EINRICHTUNGEN

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**#043 Fraunhofer Establishment for Applied Optics and Precision Mechanics**

Fraunhofer Einrichtung für Angewandte Optik und Feinmechanik  
Physikalisch-Astronomische Fakultät

Friedrich-Schiller Universität

Max-Wien Platz 1

D/O-6900 Jena

Telephone: +49 (3641) 852-539

Telefax: +49 (3641) 822-2345

Director: Prof. Dr. Wolfgang Karthe

Personnel: 60, of which 36 scientists and engineers

**#043\*K3JAN92\* Fraunhofer Establishment for Applied Optics and Precision Mechanics**

**Research objectives**

- The development of new and improved optical layers and layer systems and their application with regard to classical optic as well as microelectronic structures and sensors.
- Optical precision systems and holographic-optical elements for modern measuring, testing and production labs and processes.
- Piezoelectrical geared actuators and their integration and combination with optical function elements, for example, automatic focussing optic, precision cutting and controllable grids.
- Machinery and precision mechanics for product-specific special technologies of the precision mechanical optical industry; for precision storage technology and bookkeeping as well as processes of production.

#043\*IOCT91\* The Institute has the following four departments, with names of the heads and the tasks:

1. Optical Layers, Head: Dr. Norbert Kaiser.

Work on layer optics began in Jena in 1935. Since then, research and development efforts were mostly localized at the company Zeiss/Jena. To conduct contract research in relation to the spectral enlargement of the areas of activity of Zeiss/Jena, about ten years ago several groups were established as well in the Institute of Technical Physics (mostly ultraviolet) as in the Friedrich-Schiller University Jena (mostly in the infrared regime).

2. Optical Systems, Head: Dr. Richard Kowarschik, Dr. Lutz Wenke.

Modern equipment for measurement, testing and production increasingly apply systems of optical precision technology which do neither touch nor destroy the object, or apply holographic-optical elements (HOE). Well established conditions for these procedures are to be found at the Friedrich-Schiller University in its School of Physics and Astronomy and School of Scientific Technology, as well as in the commercial "Jenoptik Carl Zeiss Jena Ltd".

3. Fine-mechanical and Fine-mechanical/Optical Systems, Head: Prof. Dr. Wolfgang Karthe.

There is a strong growing trend in the market for fine-mechanical and fine-mechanical/optical components and systems applying the highest precision and reliability, simplified servicing, and miniaturized forms. This trend is created on one hand by requirements in other growing markets (optoelectronics, optical communication, electronics, medical technology, etc.), on the other hand by the quick development of modern technologies. - There are gaps between the various well-established technical procedures, therefore up to now only a few system solutions have been tried. In addition, the advanced technologies require a highly-developed and expensive know-how, therefore the acceptance rate by producers and other appliers within the small business community ("KMU") is small. This situation requires the development of components and systems in individual steps in such a way that for each step a transfer to KMU is possible.

4. Propulsion Systems and Fine-Production Technology, Head: Dr. Volker Guyenot.

Long-term experience in basic and applied research for the production of optical construction elements and the placement of optical elements are available at the Friedrich-Schiller University in Jena. Other long-term experience is available in connection with the Technical University Ilmenau in the areas of precision linear propulsion controlled by micro-computers.

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#043/03  
17 NOV 92

**#043\*IAUG92\* Research and Development Offers for the benefit of industry:**

**Optical Systems**

- Contact-less measuring procedures for form and position of construction elements and function planes
- Application of phase-conjugate mirrors in the optical measuring technique
- Testing of fine-mechanical and optical surfaces
- Application of compact holographic systems to measure variations in form and/or positions in the range of micrometers and less
- Application of optical phase measuring procedures in connection with special receiver technology and modern image processing procedures
- Development and application of optical diffraction systems.

**Fine-Mechanical and Fine-Mechanical/Optical Systems**

- fine-mechanical-optical modules
- miniaturization of adjustable imaging and lighting optics
- piezo-electrically controlled actors with long action radius and resolutions in the nanometer range.

**Precision Production Technology**

- Development of precise and ultra-precise bearing technology in the ranges of less than micrometers and of nanometers
- Development of procedures and technological special facilities for special technologies in small businesses (in particular within the fine-mechanical and optical industry), these technologies being product-oriented
- Promotion of technological and production-technical special procedures in fine mechanics and optics.

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Optical Layers

- Interference layer systems for the construction of optical instruments
- Interference layer systems for UV-high-power laser and beam guidance
- UV-VIS ultra-narrow band filter
- Optical characterization
- Non-optical characterization.

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**#044 Fraunhofer Establishment for Applied Polymer Research**

Fraunhofer Einrichtung für Angewandte Polymer-Forschung

Kant Straße 55

D/O-1530 Teltow-Seehof

Telephone: +49 (3328) 46-0

Telefax: +49 (3328) 46-534

Head (not confirmed according to available material):  
Prof.Dr.H.Zimmermann

**#044\*K3JAN92\*** Fraunhofer Establishment for Applied Polymer Research

Research objectives:

- Synthetic polymers i.e. the development of special polymers for selected areas of application.
- Polysaccharide research to concentrate in particular on cellulose and starch.
- Structure formation and characterization to be involved with specific changes of structures to obtain optimal structure and property relations.
- Material/process optimization under special consideration of the use of natural and synthetic polymers, especially in relation with questions of reducing the environmental impact.

G704W51-05  
#045/01  
18 NOV 92

**#045 Fraunhofer Establishment for Electron Beam- and Plasma Techniques**

Fraunhofer Einrichtung für Elektronenstrahl- und Plasmatechnik  
Zeppelin Straße 7  
D/O-8051 Dresden  
Telephone: +49 (351) 378-251  
Telefax: +49 (351) 36-139

Head of the Establishment: Prof.Dr.Schiller  
Assoc.Head for Research: Herr Nedon

**#045\*K3JAN92\* Fraunhofer Establishment for Electronic Beams and Plasma Techniques**

**Research objectives:**

- The electronic beam technique, i.e. the development of electronic tubes in a capacity range of a few watts up to a megawatt and their use in fabrication.
- The main layered surface construction using an electronic beam evaporator, with a commercial surface refinement of wrought products with a separation speed of  $1.10\mu\text{m/s}$ .
- The plasma coating technique through PVD process by using magnetically fed low pressure plasma for steam production and plasma enhanced coating of metallic and non-metallic substrates.

**#045\*M6JUL92\***

**Scientific Goal:**

Research and development in the areas of electron-beam and plasma technology. Development of electron-beam "cannons" and of plasma sources with the various parameters. Preparation for the application of new technologies: improvement (stabilization) of surfaces, modification of thin-layer deposition by vaporizing and sputtering. Bridge-building between theory and practice. Industrial solutions and economic considerations.

**Emphases:**

Development of electron-beam "cannons"; preparation of applications of electron-beam technologies; sources and processes of magnetron sputtering; production of thin layers by high-rate PVD techniques; modulation of surfaces by electron-beams and plasmas; procedure control, modelling, scale amplification and affirmation of quality.

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G704W51-06  
#046/01  
18 NOV 92

**#046 Fraunhofer Establishment for Factory Performance and Automation**

Fraunhofer Einrichtung für Fabrikbetrieb und Automatisierung  
Bleckenburg Straße 25  
D/O-3011 Magdeburg -- or:  
Postfach 124  
D/O-3010 Magdeburg  
Telephone: +49 (391) 44-281  
Telefax: +49 (391) 48-084  
Telex: 8496 fer dd

Head of the institute: Prof.Dr.Dr.E.Gottschalk

**#046\*K3JAN92\* Fraunhofer Establishment for Factory Management and Automation**

Research objectives:

- Automation to increase productivity
- Production planning and controlling as well as the solving of problems of its logistics
- Improvement of the organization of maintenance to increase the continuity of production and lower its costs.

**#046\*Q191\*1.**

GENERAL SURVEY

1.1. Address, Telephone etc.: see above

1.2. Setting, Environment, Access:

The institute is in the town of Magdeburg, in the center of Germany , to be reached via autobahn 2 or by railroad (Line Hannover-Berlin).

1.3. Organization, Structure, Hierarchy:

The institute is part of the Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e. V. (Fraunhofer-Society for furtherance of applied research registered association).

The head of the institute is Prof. Dr. Dr.-Ing. Eberhard Gottschalk.

The institute covers the four departments:

- Logistics and Production Planning and Control  
(leader: Doz.Dr.-Ing. habil. Michael Schenk)
- Quality Assurance  
(leader: Dr.-Ing. Horst Lewy)
- Maintenance Organization  
(leader: Dr.-Ing. Gerhard Müller),
- Automation  
(leader: Dr.-Ing. habil. Schmucker)

1.4. Employees:

In January 1 1992 there will be employed about 26 scientists, 4 technicians and 30 "soft money" fellow workers. In the future the number of employees is expected to be increased to about 90.

1.5. Institute Publications, Host Conferences:

In the middle of 1992 the institute will publish its own regular series of scientific reports.

2. HISTORY OF THE INSTITUTE

2.1. Long-term History, Founding of the Institute, Tradition:

The Fraunhofer-Institution for Manufacturing and Automation will be founded on January 1, 1992. The institute emerges from the University-Institute for Automation and Manufacturing of the Technical University "Otto von Guericke" Magdeburg and the FER Engineering Ltd Magdeburg. These enterprises work since 20 years together on the area of Manufacturing and Automation.

2.2. Recent history:

Between the University-Institute for Automation and Manufacturing (Prof. Gottschalk) and the Fraunhofer-Institute for Production Engineering and Automization Stuttgart (Prof. Warnecke) existed contacts since 1984, improving year after year and entering into an agreement about cooperation in 1990. In these contacts the FER-Engineering Ltd. was included already at an early stage because of its cooperation with the Technical University Magdeburg.

Magdeburg was and will be in future an important center of metal-working industry, especially mechanical engineering which kept its importance after the german unification.

3. RESEARCH

3.1. Scientific areas covered:

- specific problems of mechanical engineering concerned with stepwise and supplementary automation to increase productivity (use of robotics, especially in handling processes, in foundries and forges, automation of conveyance-, change- and stocking-processes, making of continuous automation lines in flexible manufacturing systems, introduction of control techniques, local area networks, etc.)
- specific problems of mechanical engineering concerning with logistics and production planning and -control (PPC) also production management to increase in efficiency (technical and organizing foundation of series of information- and material-flow between outside manufacturers, final manufacturers and customers, stocking-process rationalization and automation based on logistic models, introduction and improvement of PPC-models under the rules

of market economy, programming of production control surfaces, rationalization of operating data recording, building site organizations, etc.)

- specific problems of mechanical engineering concerning with technical and organizing quality assurance to increase in product quality (integration of measuring techniques and testing procedures in the continuous automation process, introduction of not yet existing quality control systems covering from construction to forwarding department, organizing coupling of quality assurance with PPC by quality-orientated scheduling, developing or application of expert systems in quality assurance, etc.)
- specific problems of mechanical engineering concerning with maintenance organization to increase in continuity of the production and to cutting cost (developing of unique systems of maintenance organization, including taking technical measures and means in this system, coupling of maintenance with PPC and integration in the communication system of the factory, developing or application of maintenance expert systems etc.)

### 3.2. Specific scientific activities: List of selected publications:

Gottschalk, E.  
Schenk, M.  
Produktionsprozeßsteuerung in Gießereien  
(Production Process Control in foundries)  
Deutscher Verlag für Grundstoffindustrie Leipzig 1987 (319  
Seiten)

Autorenkollektiv  
Grundlagen der CAD/CAM-Arbeit  
(Fundamentals of CAD/CAM-work)  
Fachbuchverlag Leipzig 1988

Gottschalk, E.  
Wirth, S.  
Bausteine der rechnerintegrierten Produktion  
(Components of computer integrated production)  
Verlag Technik Berlin 1989 (232 Seiten) und  
Lizenzausgabe bei  
Carl-Hanser-Verlag München-Wien (Hanser-Studienreihe)

Gottschalk, E.  
Rechnergestützte Produktionsplanung und -steuerung  
(Computer aided production planning and -control)  
Verlag Technik Berlin 1989 (592 pages).

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#046/04  
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Gottschalk, E.  
Schenk, M.  
Programmbeispiele für dezentrale Rechentechnik in Gießereien -  
Ein Beitrag zur Produktionsporzeßsteuerung  
(Programming examples of decentralized computers in foundries -  
a contribution to production process control)  
Deutscher Verlag für Grundstoffindustrie Leipzig 1990 (180  
pages)

Gottschalk, E.  
Schenk, M.  
Moderne rechnergestützte Produktionsorganisation in Gießereien -  
notwendige Voraussetzungen;  
(Modern computer aided production organization in foundries -  
necessary suppositions)  
Gießereitechnik 32(1986)6, S. 180-185

Gottschalk, E.  
Wirth, S.  
Voraussetzungen für effektivere Produktionsorganisation -  
verstärkte Aus- und Weiterbildung auf diesem Gebiet;  
(Suppositions for effective production organization -  
intensified training on this area)  
Fertigungstechnik und Betrieb 36(1986)7, S.390

Gottschalk, E.  
Voraussetzungen für eine effektivere Produktionsorganisation -  
Analyse im Maschinenbau der DDR;  
(Suppositions for effective production organization - analysis  
of mechanical engineering of the GDR)  
Fertigungstechnik und Betrieb 36(1986)7, S.391-397

Gottschalk, E.  
Rationalisierung mit und ohne Roboter  
(Rationalization with and without robots)  
VDI-Nachrichten Nr. 36, 5.9.86, S.31

Gottschalk, E.  
Schenk, M.  
Die Zukunft der Produktionsplanung und -steuerung in der  
Automatisierung der Gießereien (Teil 1);  
[The future of production planning and control concerning  
automization of foundries (part 1)]  
Gießereitechnik 34(1988)5, S.139-141

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#046/05  
18 NOV 92

Gottschalk, E.

Schenk, M.

Die Zukunft der Produktionsplanung und -steuerung in der  
Automatisierung der Gießereien

(Teil 2: Zu realisierende Schritte);

(The future of production planning and control concerning  
automization (part 2: steps to go))

Gießereitechnik 34(1988)6, S.176-183

Gottschalk, E.

Tempelhof, K.-H

CIM in der DDR - Teil 1: Schritt für Schritt und  
aufwärtskompatibel;

(CIM in the GDR - part 1: step by step and bottom-up compatible)

Technische Rundschau Bern 22/1987, S. 14-17

Gottschalk, E.

Tempelhof, K.-H

CIM in der DDR - Teil 2: Planung und Steuerung als geschlossenes  
System;

(CIM in the GDR - part 2: planning and control as a united  
system)

Technische Rundschau Bern 23/1988, S. 20-23

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#046/06  
09 OCT 92

Gottschalk, E.

Alles fließt - Planen und Steuern in der flexiblen Fertigung  
(Everything flows - planning and controlling in flexible  
production)

Maschinenmarkt, Würzburg Nr. 24/1987, S.46-51

Flexible automatisierte Fertigung - eine Herausforderung an die  
Produktionsprozeßsteuerung

(Flexible automatized production - a challenge to production  
process control)

Wissenschaftlich-technische Mitteilungen des FER, Heft 2,  
Magdeburg 1986

#### 4. GERMAN UNIFICATION, TRANSITION

##### 4.1. Wissenschaftsrat (Science Council):

The Science Council did not investigate the institute.

##### 4.2. Special problems of an administrative character:

The employees of the University-Institute have intensive contacts  
to scientific institutes since many years in the East and since  
1983 also in the West (scientist exchange, colloquies).

The institute will build up with the standard of the Fraunhofer-  
Gesellschaft and therefore will make all international  
information and communication systems connected with this  
standard available to the institute.

##### 4.3. International Contacts:

The previous contacts to the scientific institutes of the

Technical University of Charkow, USSR

Technical University of Bratislava, CSFR

Technical University of Miskolc, Hungaria

Technical University of Warschau, Poland

which were also based on personally engagement, shall by all means  
kept.

##### 4.4. Scientific problems to be abandoned after 01 January 1992:

The institute was built with regard to the altered situation of  
the industry after German unification. Therefore the treatment  
of the scientific problems previously mentioned will continue.

##### 4.5. Released scientists:

There are no released scientists.

#### 5. Specific Problems, Potential ONR Europe Support etc.

The help of ONR Europe could be the arrangement of contacts with  
similar-orientated American institutes with regard to  
international collaboration.

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#047/01  
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**#047: Fraunhofer Establishment for Ceramics Technology and Sinter Materials.**

Fraunhofer Einrichtung für Keramische Technologien und Sinterwerkstoffe (IKTS)  
Winterberg Straße 28  
D/O-8020 Dresden  
Telephone: +49 (51) 2322-519 or -564  
Telefax: +49 (51) 2322-599

Founding Director: Prof.Dr.Waldemar Hermel  
Deputy: Dr.Udo Gerlach  
Employees: 77

**#047\*K3JAN92\* Fraunhofer Establishment for Ceramics Technology and Sinter Materials**

**Research objectives:**

- Powder technology with the goal of a technical realization of material developments for the production of materials with a minimum of defects as well as their components, e.g. industrial grinding bodies, sliding rings, indexable insertion on industrial level.
- Development of materials and parts in the structure ceramics.
- The development of functional ceramics for electric, dielectric, ferroelectric and piezoelectric elements, such as sensors, actuators, and passive components.

**#047\*M6AUG92\*(abbreviated)**

**Scientific Goals:**

Anorganic-nonmetallic materials and selected powder-metallic high-performance materials with emphasis on innovative applications as functional elements or proto-typical construction elements. Special emphasis is on constructional or functional applications in the following groups of materials: Structural ceramics, functional ceramics, Cermets, hard metals and ceramic-ceramic compounds and ceramic-metal compounds.

Applied basic research: material science research and procedural solutions going as far as to the construction of pilot construction models and transfer of specifically developed process technologies into industry.

**Sections:**

- Powder technologies, procedure- and construction- element development
- Structure ceramics
- Function ceramics
- Characterization of materials.

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#048/01  
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**#048: Fraunhofer Institute for Microelectronic Circuits and Systems, Dresden Department.**

Fraunhofer Institute für Mikroelektronische Schaltungen und Systeme, Institutsteil Dresden (IMS 2)

Grenz Straße 28

D/O-8080 Dresden

Telephone: +49 (51) 5823-0 (switchboard), 5823-111 (inst.admin)

Telefax: +49 (51) 5823-266

Director: Prof.Dr.G.Zimmer (in Duisburg)

Person of Contact: Dr. Kück (in Dresden)

Employees: 130

**#048\*K3JAN92\* Fraunhofer Establishment for Microelectronic Circuits and Systems**

**Research objectives:**

**- CMOS control systems**

especially analog digital transporters for system integration filters, precision amplifiers, and other components in BICMOS, respective to low voltage low power technologies for application in telecommunications, medical technology and entertainment electronics.

**- Embedded systems**

i.e. application-specific controllers with system peripheral equipment especially for automobile-technology and control technology under optimization of electromagnetic compatibility and testability.

**- Micro systems**

In the form of single chip or multi-chip solutions where silicium sensors will be integrated with signal processing in CMOS technology.

**- Complete systems solutions**

In the area of electronic equipment and subsystems for large comprehensive systems there is a need for R&D support through modern electronic solutions for systems of medical technology, control technology, measuring and regulation technology, and telecommunications.

**#048\*M6AUG92\* Fraunhofer Institute for Microelectronic Circuits and Systems, Dresden Department.**

**Scientific Goals:**

With the purpose to develop new market-friendly and economic system solutions by applying sophisticated know-how in circuit- and general technology, research and development are conducted in close cooperation with the users of microelectronics. This will



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also support the introduction of cutting-edge technologies into the industry, especially the small-business sectors, in the five new länder.

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**#049: Fraunhofer Establishment for Software and Systems Technique**  
Fraunhofer Einrichtung für Software- und Systemtechnik (ISST)  
Kur Straße 33  
D/O-1086 Berlin  
Telephone: +49 (30) 20372-0  
Telefax: +49 (30) 20372-207

Director: Prof.Dr.H.Weber  
Admin.Leader: Dr.Koch

**#049\*K3JAN92\*** Fraunhofer Establishment for Software and Systems Technique

Research objectives:

- The main areas of work of the FhE are focussing on applied research and development in the areas of Software-Engineering, systems-engineering for software-intensive systems and computer aided software and systems engineering as well as in the transfer of corresponding safeguarded technologies of industry.

Essentially, this means work in

- the preparation of formal concepts and theoretical bases for software development and software structuring.
- the development of tools and software development environments also through testing and use of experts systems with the goal of continuation of development of tools developed within the university research and the development of integration concepts for the fusion of individual tools to software development environs.
- concepts and processes of software rewriting including the analysis of existing systems and also the development of industrial insertable restructuring processes and management specific tools for renovating software systems.
- concepts and processes to insure quality for software and software intensive systems.

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**#050: Fraunhofer Establishment for Metal Forming and Heavy Machinery, Chemnitz**

Fraunhofer Einrichtung für Umformtechnik und Werkzeugmaschinen  
Chemnitz (IUW)

Reichenhainer Straße 88

D/W-9022 Chemnitz

(former address: Mommsen Straße 13, D/O-8027 Dresden)

Telephone: +49 (371) 561-4726

Telefax: +49 (371) 55589

Directors: Dr.R.Umbach (acting), Dr.R.Neugebauer, Prof.Heimann

Employees: 95

**#050\*K3JAN92\* Fraunhofer Establishment for Metal Forming and Heavy Machinery**

Research objectives:

- Transformation processes with regard to increased productivity, material and energy savings, increased flexibility, process stabilization manufacturing quality, and finished product quality.
- Development of metal forming machines under special consideration of the demands of fabrication techniques.
- Quality control.

**#050\*M6AUG92\***

Scientific goals:

Increasing the area of application of metal forming technologies.

Improvement of the quality of products.

Increasing the reliability and stability.

Increasing productivity.

Decreasing burden to the environment, making the working environment more humane.

Departments:

Metal forming procedures and tools.

Heavy machinery and automatization technology.

Quality- and simulation techniques.

G704W51-16  
#051/01  
18 NOV 92

**#051: Fraunhofer Establishment for Material Physics and Lamination Technology**

Fraunhofer Einrichtung für Werkstoff-Physik und Schicht-Technologie (IWS)

Helmholtz Straße 20

D/O-8027 Dresden

Telephone: +49 (51) 4659-262

Telefax: +49 (51) 4659-544

Director: Dr.Reizenstein

Employees: 56

**#051\*K3JAN92\* Fraunhofer Establishment for Material Physics and Lamination Technology**

Research objectives:

Laser supported thin layering technology, including a.o.

- Process for laser supported precipitation of simple and multilayers in the nanometer range for the manufacturing of layering systems with special x-ray optical, optical and mechanical properties and
- processes for laser controlled vacuum curved precipitation of hard material and carbon layering with variable spectral properties.

The material techniques of the radiation technology, i.e.

- Technology-oriented and specific components research for fixed phase transformation to recast and melt down alloys, as well as coating of metallic materials and for the selection and optimization of additional materials.
- scientific basis of materials, their choice of processing and parameters to develop software for computer aided preparation, guidance and optimization processes.
- Determination of property control factors when applying radiation technology as well as property prognosis for complex stress situations.

**#051\*M6AUG92\* Departments:**

Technology of nanometer layers  
Layer deposition at high rates  
Modelling of processes  
Material techniques I and II  
Characteristics, properties  
Development of procedures  
Optimization of systems.

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#052/01  
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**#052: Fraunhofer Establishment for Dependable Integrated Microsystems**

Fraunhofer Einrichtung für Zuverlässige Integrierte Mikrosysteme

At the time of this writing, we did not have an information whether or not this institution would be established. For questions, address:

Fraunhofer Gesellschaft

Leonrod Straße 54

D/W-8000 München 19

Telephone: +49 (89) 1205-0

Telefax: +49 (89) 1205-317

**#052\*K3JAN92\* Fraunhofer Establishment for Dependable Integrated Microsystems**

**Research objectives:**

The main mission of the FhE lies in the applied research, the development of micro systems, especially in the direction of examining the degree of their dependability; as well as the development of concepts for dependable micro systems for the economy.

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## Chapter 5.2:

### FRAUNHOFER BRANCH LABS = FRAUNHOFER AUSSENSTELLEN

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#### **#054: Fraunhofer Branch Lab for Automation of the Circuit and Systems Projection**

Fraunhofer Aussenstelle für die Automatisierung des Schaltkreis- und System-Entwurfs, Dresden (EAS)

Haeckel Straße 20

D/O-8027 Dresden

Telephone: +49 (351) 463-211

Telefax: +49 (351) 4717-558

Leader (acting): Dr. Elst

Employees: 30

#### **#054\*K3JAN92\* Fraunhofer Branch Lab for Automation of the Circuit and Systems Projection**

##### Research objectives:

The work of the Lab centers on the development of tools for the VLSI and system projection as well as circuit development. The emphasis lies on

- High level and logic-synthesis (e.g., silicon compiler for SC filter Petri nets regarding the connection with the control system for tool machines)

- Multi-level simulation and modelling (simulation of SC-filters, analog/digital-simulation for intelligent sensors and circuit work, i.e. measuring)

- Applicable circuit development (e.g. analog/digital ASICs, sensor circuitry).

#### **#054\*M6AUG92\***

##### Goals:

Development of methods and tools for the computer-assisted design of circuits and systems for specific applications. Implementation of innovative system solutions for the design of circuits and systems. Development of algorithms for the enhanced automation of the design process.

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#055/01 - #056/01  
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**#055: Fraunhofer Branch Lab for Image Processing**  
Fraunhofer Aussenstelle für Bildverarbeitung (EBV)  
Kur Straße 33  
D/O-1086 Berlin  
Telephone: +49 (30) 20372-0  
Telefax: +49 (30) 20372-20

Leader: Dr.G.Spur, the leader of the IPK Berlin

**#055\*K3JAN92\* Fraunhofer Branch Lab for Image Processing**  
Research objectives:

- Image processing for the inspection of work pieces based on expert systems (artificial intelligence).
- Document processing for the inclusion of conventional technical documents, based on expert systems.
- Representation and interpretation of knowledge, among others for the application of neuronal networks in modal recognition.
- Quality technology in relation to the development of overall concepts for highly precise production plants as well as the development of crypto components for highly exact systems such as actuators, conduct and storage.

=====

**#056:Fraunhofer Branch Lab for Biochemical Ecolo-Toxicology**  
Fraunhofer Aussenstelle für Biochemische Ökotoxikologie  
Arthur-Scheunert-Allee 1140116  
D/O-1505 Bergholtz-Rehbrücke (Brandenburg)  
Telephone: +49 (33200) 8-0  
Telefax: +49 (33200) 8-206

Leader: Prof.Dr.W.Klein  
Person of Contact: Prof.M.Kujawa

**#056\*K3JAN92\* Fraunhofer Branch Lab for Biochemical Ecotoxology**  
Research objectives:

- the evaluation of metabolites with regard to the ecotoxological effect of decomposition products. For this a systematic method and its inclusion in the chemical assessment, especially of plant preservatives should be established.
- Biochemical ecotoxology indicators as ecotoxological "sondes" for use in experimental screening and for the identification of problematic materials.

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#056/02 - #058/01  
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- Endogenous indicators for sub-acute noxen, i.e. investigation to identify defense mechanisms of organisms under sub-acute stress. This is intended as a contribution to explain LOEC rates of damaging effects of small doses.
- Environmental analysis.

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**#057: Fraunhofer Branch Lab for Graphic Data Processing**  
Fraunhofer Aussenstelle für Graphische Datenverarbeitung  
Joachim-Jungius Straße 9  
D/O-2500 Rostock 6  
Telephone: +49 (381) 44-2185  
Telefax: +49 (381) 44-1065

Leader: Prof.Dr.J.L.Encarnacao  
Person of Contact: Dr. B.Urban

**#057\*K3JAN92\*** Fraunhofer Branch Lab for Graphic Data Processing  
Research objectives:  
The integration of computer graphics and image processing with progressive methods of visualization techniques and their application

- in medicine in the area of victuals and in ocean research
- in energy technology and supply
- for supercomputing, networking and visualization.

=====

**#058: Fraunhofer Branch Lab for Microstructure of Materials and Systems.**  
Fraunhofer Aussenstelle für Mikrostruktur von Werkstoffen und Systemen  
Heide Allee 19  
D/O-4050 Halle (Saale)  
Telephone: +49 (345) 642073  
Telefax: +49 (345) 22155

Leader: Prof.Dr.E.Sommer  
Person of Contact: Dr.M.Kuna  
Employees: 16

Three departments in the field of Material-Mechanics are:  
Microstructure Investigation and Properties of Materials;  
Mechanical modelling and calculation;  
Materials mechanics of micro systems.

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#058/02 - #059/01  
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**#058\*K3JANS92\* Fraunhofer Branch Lab for Microstructure of Materials and Systems**

**Research Objectives:**

- The exploration of microscopic structures and processes at deformation and fatigue of materials, such as glass, synthetics, metals, composites.
- The modeling of the mechanical behavior of materials and microsystems at deformation, breaking, and failure.
- the investigation of the mechanical behavior and the solidity-determining process of material and building components of microsystem technology.

=====

**#059: Fraunhofer Branch Lab for Polymer Compounds**

Fraunhofer Aussenstelle für Polymer-Verbunde (EPV)

Kant Straße 55

D/O-1530 Teltow-Seehof

Telephone: +49 (3328) 46-0

Telefax: +49 (3328) 46-58

Leader: Prof.Dr.H.D.Kunze

Person of Contact: Prof.M.Bauer

**#059\*K3JAN92\* Fraunhofer Branch Lab for Polymer Connection**

**Research objectives:**

- The synthesis of polymers after measurement, such as for the microsystem technique for coating and enameling and for high-temperature systems.
- The investigation of the change effects in polymer-metal-border-layers.
- The modelization of the polymer image in bulk and thin layers.



G704W52-05  
#060/01 - #061/01  
19 NOV 92

**#060: Fraunhofer Branch Lab for Process Optimization**

Fraunhofer Aussenstelle für Prozeß-Optimierung (EPO)

Kur Straße 33

D/O-1086 Berlin

Telephone: +49 (30) 20372-0

Telefax: +49 (30) 20372-20

Leader: Prof.Dr.H.U.Steusloff (Karlsruhe)

**#060\*K3JAN92\* Fraunhofer Branch Lab for Process Optimization**

Research objectives:

- The planning and optimization of technical processes
- The development of models through the use of analytical and adaptive expert systems (artificial intelligence) component systems and their application to environmental systems, energy production, and agriculture.

=====

**#061: Fraunhofer Branch Lab for Process Control Systems**

Fraunhofer Aussenstelle für Prozeßsteuerung (EPS)

Haeckel Straße 20

D/O-8027 Dresden

Telephone: +49 (351) 463-3069

Telefax: +49 (351) 471-7558

Leader: Prof.Dr.H.U.Steusloff (Karlsruhe)

Person of Contact: Prof.Dr.H.H.Wilfert

Employees: 25

**#061\*K3JAN92\* Fraunhofer Branch Lab for Process Control Systems**

Research objectives:

- The operational control and on-line control of large technical systems.
- System modelling and simulation using expert-system-based (artificial intelligence) projections and the theory of a non-linear dynamic system and their application to energy-convective systems, gas high pressure nets, and technical method processes.

**#061\*M6AUG92\* Departments or Sections: Modelling of complex technical systems/simulation. Expert-systems-based methods for design and planning of operative systems. Hybrid process controls. Systems with distributed parameters.**

G704W52-06  
#062/01  
19 NOV 92

**#062: Fraunhofer Branch Lab for Powder Metallurgy and Compound Materials**

Fraunhofer Aussenstelle für Pulvermetallurgie und Verbundstoffe  
Helmholtz Straße 20  
D/O-8027 Dresden  
Telephone: +49 (351) 4659-248 or -277  
Telefax: +49 (351) 4659-549

Manager of the Branch Lab: Dr. Bernd Kieback  
Deputy: Dr. Stephani  
Employees: 18

**#062\*K3JAN92\* Fraunhofer Branch Lab for Powder Metallurgy and Compound Materials**

**Research objectives:**

The work of the Branch is in the realm of material analysis and technological solutions for the production and the use of new power metallurgy and compound materials. The range of technological research covers material development to specific areas for prototype building components or functional simulator production.

**Special work areas are:**

- Fiber metallurgy (PM-quick cool down, fiber production and application, MMC-interlocking materials).
- High temperature materials (intermetalloid, metallic HT-materials, compound materials)
- Tribologic special materials
  - Powder technology (powder production, processing, heat treatment).

**#062M6AUG92\*** Research emphasis: High-Temperature materials (intermetallides, metallic high-temperature materials, compound materials, light-construction elements). One aim is to approach the unity between material, construction element and production technology by using relations between them which correspond to the necessities of later use (free translation).

G704W52-07  
#063/01 - #064/01  
19 NOV 92

**#063: Fraunhofer Branch Lab for Robotic System Technology**  
Fraunhofer Aussenstelle für Robotersystemtechnik (ERS)  
Kur Straße 33  
D/O-1086 Berlin  
Telephone: +49 (30) 20372-0  
Telefax: +49 (30) 20372-20

Leader: Prof.Dr.H.Spur

**#063\*K3JAN92\* Fraunhofer Branch Lab for Robotic System Technology**  
Research objectives:

- Special areas of robotic systems technology, a.o., aiming at the development of medical establishments for rehabilitation
- Planning and control systems methods for industrial robotics
- Precision technique aiming at carrying on the development of numerical control system technology to increase precision of work
- Technical system realization, e.g., for the construction and production of claw feed systems.

=====

**#064: Fraunhofer Branch Lab for Acoustical Diagnostics and Quality Control**  
Fraunhofer Aussenstelle für akustische Diagnostik und Qualitätssicherung (EADQ)  
Krüger Straße 22  
D/O-8054 Dresden  
Telephone: +49 (351) 36666  
Telefax: +49 (351) 36301

Leader: Dr.E.Pridöhl  
Employees: 29

**#064\*K3JAN92\* Fraunhofer Branch Lab for Acoustical Diagnostics and Quality Control**

Research objectives:

The research of this branch is in the area of acoustical diagnostic processes to safeguard relevant systems and processes a.o. or their use as a tool of quality control of the product and production planning. Individual areas of application are e.g.

- Operational monitoring of systems in the chemical industry and in power plants
- Technology transfer into the regional industry
- Acoustic sensors
- Services (training, measurements, and testing)

G704W52-08  
#064/02 - #065/01  
19 NOV 92

**#764\*M6AUG92\* Research Emphasis:**

Sound propagation in media and in structures of all types of complexity.  
Localization of active and passive sources of sound.  
Evaluation of acoustic signals to obtain basic values related to safety, applying, a.o., KI- methods.  
Specific services on active and passive testing by ultrasound.  
Development of innovative acoustical testing and surveillance technologies.  
Development of quality-sensing {translation doubtful} tools and their integration into total (all-encompassing) management of quality and of production processes.

=====

**#065: Fraunhofer Branch Lab for Air Chemistry**

Fraunhofer Aussenstelle für Luftchemie (ELC)  
Rudower Chaussee 5  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-5065  
Telefax: +49 (30) 6774-239

Person of Contact: Dr.D.Möller

**#065\*K3JAN92\* Fraunhofer Branch Lab for Air Chemistry**

**Research objectives:**

- Atmospheric multi-phase chemistry, especially for the investigation of interactions between gaseous contaminants and the liquid phase in cloud water.
- Development of optical remote exploratory methods and their application for the determination of concentration of gaseous trace materials in the atmosphere.

MAIN CHAPTER 6:

MAX-PLANCK INSTITUTES, WORKING GROUPS AND BRANCH INSTITUTES

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contains:

- Chapter 6.1: Max-Planck Institutes
- Chapter 6.2: Max-Planck Working Groups (M.P.Arbeitsgruppen)
- Chapter 6.3: (East-German) Branch Institutes of (West-German) Max-Planck Institutes  
(Aussenstellen von Max-Planck Instituten)

For general information on the Max-Planck Society see Part A of this REPORT, Chapter 4.5.2.1. In the transition process, the Max-Planck Society installed three types of institutions in East-Germany: full-fledged Institutes (2 of them), Branch Institutes of existing (West-German) Max-Planck Institutes (also 2 of them) and 25 "hard sciences" Max-Planck Arbeitsgruppen (Working Groups). These groups are located at universities but independent of them, being fully supported by the Max-Planck Society. It is expected that after five years (i.e. about January 1998) these groups may either become Max-Planck Institutes, or institutes of a university.

In establishing these East-German institutions, the Max-Planck Society followed, in principle, its old tradition (already a principle of the Kaiser-Wilhelm society after 1911): to "build an institute around an outstanding scientific personality".

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Chapter 6.1:

MAX-PLANCK INSTITUTES IN EAST-GERMANY  
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**#067 Max-Planck Institute for Microstructural Physics**

Max-Planck Institut für Mikrostrukturphysik

Postfach 250

Weinberg 2

D/O-4050 Halle (Saale)

Telephone: +49 (345) 601512

Telefax: +49 (345) 27155

**Board of Directors:**

Prof.Dr.h.c.H.Fischmeister (acting)

Prof.Dr.U.M.Gösele

Prof.Dr.J.Heydenreich

Prof.Dr.J.Kirschner

Prof.Dr.M.Rühle (acting)

Leader of Administration: Dr.W.Keller

Personnel: about 100, among them 45 scientists.

The Max-Planck Institute is based on the Institut für Festkörperphysik und Elektronenmikroskopie Halle of the former Academy of Sciences of the GDR (Institute for Solid State Physics and Electron Microscopy) which is described below under (#067\*NJUL91\*).

**#067\*K3JAN91\* Max Planck Institute for Micro-Structural Physics**  
(alternatively: Micro structure physics)

Research objectives: The institute will deal with two experimental focal points of research:

- a) Image structure and properties of miniature solid bodies
- b) Electro-microscopic exploration of the micro structure of miniature solid bodies

In addition, as to theory, further emphasis is given to

- c) Properties of miniature solid bodies

(With the foundation of this institute the Max Planck Society is following the recommendations of the Science Council (Wissenschaftsrat) on the Academy institute for Solid State Physics and Electron-Microscopy, Halle).

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#67\***NJUL91**\* NSF Europe Report No. 31      17 July 1991  
"Institute for Solid State Physics and Electron Microscopy, Halle  
(Saale), Germany " - with corrections supplied in October 1992 by  
one of the Institute's directors.

This report is one of several pertaining to a visit to Leipzig, Halle and Dresden, Germany, 9-11 July 1991. These visits took place with the assistance of the American Embassy, Bonn and the American Consulate-General, Leipzig. Mr. Frank Kinnelly, Science Counsellor in Bonn and/or Mr. Nicholas Dean, Vice Consul in Leipzig, were co-participants in the meetings and provided important background information and logistical support. Except where otherwise indicated, the opinions expressed are those of the persons visited - as understood by the drafter.

The Institute for Solid State Physics and Electron Microscopy (IFE) is directed by a group of senior researchers, including Prof.Dr.V.Schmidt, Prof.Dr.J.Heydenreich, Prof.Dr.M.Krohn and Prof.Dr.U.Messerschmidt. This institute was, within the countries of socialist Eastern Europe, a kind of international center for analyses specializing in solid-state physics and the application of electron microscopy techniques. It was an institute of the Academy of Sciences of the former German Democratic Republic (DDR=GDR). The recent evaluation of the institute by the Federal Science Council (Wissenschaftsrat) was very favorable, in terms of the quality of work being done here. The institute has 148 coworkers of which 61 are researchers.

Next year, most of the work of the institute will be carried on in a new institute of the Max-Planck Society. The new institute will have 45 researchers, 55 technical staff and 10 doctoral students. The Fraunhofer Society will set up another group which will be connected to the Materials and Mechanics Institute in Freiburg. An additional 15-20 researchers from this institute will be in the Fraunhofer group, which will be expected to achieve the Fraunhofer standard of 80% funding from contracts within three years. The remainder of the funding will come from the federal and land governments. A further five researchers will be working at a Regional Microdiagnostics Center. The IFE had an unusually good set of connections to the west under the GDR. In the last few years, many of the researchers had a chance to travel to scientific meetings in the west. It was also possible for the institute to receive - as it did - visitors and researchers from western countries. During the last five years, some people went in each direction for longer-term stays, and 15-20 travelled to meetings in each direction. This was possible largely because of the efforts of the institute's founding director, Prof. Dr. Heinz Boethge. He told the GDR

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authorities that if they wanted to have the capability in the GDR to do the things that this laboratory could do, such exchanges would have to be permitted.

The institute's work was of importance in the development and performance of the GDR industry, mainly the microelectronics industry. Work of the institute includes areas such as:

- Measuring the energy levels of defects in semiconductors.
- Scanning deep level transient spectroscopy.
- Thermal and mechanical stress analysis of materials in situ. Using a 1Mev electron microscope able to accommodate large samples.
- Surface effects and properties studies at the atomic level using a 400 kV high resolution electron microscope.
- Studies of defects in surface films via electron emittance microscope. Ultraviolet light causes emission of electrons from the surface, and these are collected and focussed by lenses. Lateral resolution is in the nanometer range.
- Monatomic layers can be analyzed, including electronic and energy state changes.

The institute is organized today into several groups conducting research on the following areas:

LOW PLASTICITY MATERIALS,  
INTERFACES AND MICROSTRUCTURES IN CERAMIC SYSTEMS,  
HETEROGENOUS THIN FILMS,  
STRUCTURAL FORMATION OF ULTRA-THIN 2-DIMENSIONAL  
EPITAXIAL METAL FILMS,  
ELECTRON MICROSCOPIC STRUCTURAL ANALYSIS FOR MATERIALS,  
RESEARCH IN THE NANOMETER RANGE,  
FORMATION AND INTERACTION OF EXTENDED DEFECTS AND POINT  
DEFECTS IN SEMICONDUCTORS.

In addition to the research groups, there are instrument laboratories which have facilities for ultrahigh vacuum analyses, electron microscopy preparation techniques, high-voltage electron microscopy, high-resolution electron microscopy, analytical electron microscopy and scanning electron microscopy. At the IFE, an International Center for Electron Microscopy does exist. The latter, though in existence since 1975 for cooperation with Eastern Europe, will from 1992 be dedicated to building bridges between east and west.



**NSF/EUROPE Comment:** The Institute for Solid State Physics and Electron Microscopy was favored with a strong and effective leader in Boethge, and with being in the right field at the right time. The result is that this is one of the least isolated and most up-to-date laboratories in the east. They have been innovative in the use and the modification of the equipment available to them - as in the use of the 1 Mev JEOL electron microscope fitted with custom-made stages for in situ deformation studies. The institute apparently had no trouble obtaining the high-quality JEOL equipment.

**#067\*Q2OCT92\*** Max-Planck Institute for Microstructure Physics; answers to questionnaire (see above in chapter 1.3) corrected by the Institute in October 1992:

**1. GENERAL SURVEY**

- 1.1. Address, Telephone, etc.: see above
- 1.2. Setting, Environment, Access: close to the university campus near the "Klinikum Kröllwitz" in Halle northwest.
- 1.3. Organization, Structure, Hierarchy, Director:  
Institute of the Max-Planck Society for the Promotion of Science; for directors etc. see above.
- 1.4. Employees:  
100 billets,  
of which 45 scientists, 44 technicians, 11 infrastructure;  
plus 20-50 soft-money employees, guests, graduates.
- 1.5. Institute Publications, Host Conferences:  
annually one or two "Schools for Electronmicroscopy"  
(see also under #067\*IOCT92\*, below)

**2. HISTORY OF THE INSTITUTE**

- 2.1. Long-Term History, Founding of the Institute, Tradition:  
This Max-Planck Institute was established on 01 January 1992. It continues the work of the Institute for Solid State Physics and Electron Microscopy of the former Academy of Sciences of the GDR (see also #067\*IOCT92\*, below)
- 2.2. Recent History:  
The Senate of the Max-Planck Society resolves to establish an institute in Halle. The institute begins working 01 January 1992

**3. RESEARCH: see #067\*IOCT92\* below**

**4. GERMAN UNIFICATION, TRANSITION**

- 4.1. Wissenschaftsrat (Science Council): WR recommends to establish a Max-Planck Institute, refer to *Phys.Blätter* 47:8:763-767, 1991.
- 4.2. Special problems of an administrative (i.e. not scientific) character: The scientific equipment and possibilities to travel during the GDR period were - compared to the

situation of other institutes - relatively good, but equipment was aged, computer facilities not significant, only small amount for literature. Improvement of this situation is expected by incorporation into the Max-Planck Society.

4.3. International Contacts:

Good contacts to leading groups in the relevant scientific fields, both in East and West. Of special interest in this regard is the *International Center for Electron Microscopy* (see below under #97\*IOCT92\*).

4.4. Scientific problems to be abandoned after 01 January 1992:

In the future, electronmicroscopic investigations for other institutes and/or industry will be shifted to the *Laboratory for Microdiagnostics*, which is a newly established partial successor organization of the old IFE institute, same address as Max-Planck Institute, persons of contact: Dr.U.Richter and Dipl.Phys.V.Seydewitz.

**#067\*IOCT92\* Max Planck Institute of Microstructure Physics Halle (Saale)**

The Max Planck Institute of Microstructure Physics took up work on 1 January 1992. In succession to the Institute of Solid State Physics and Electron Microscopy (formerly an institute of the Academy of Sciences of the GDR) it was founded as the first institution of the Max-Planck Society in the new länder.

Microstructure physics as a topical field of solid state physics regards the investigation of phenomena as its main objective. These phenomena become particularly significant for matters of smallest dimensions (as e.g. thin films). They may be of physical or chemical nature, specifying magnetic, optical, electrical, and mechanical properties.

Classical solid state physics is based on the model of the infinitely extended, three-dimensionally periodic crystal, at the same time trying to explain the properties of the latter by this periodicity and its disturbances by lattice defects. The properties of thin films and small particles, however, are often determined by respective interfaces and by effects of the latter. The structure of thin films and small particles sensitively depends on the molecular processes proceeding during their formation and growth. The defects arising both at these stages and during subsequent physical and chemical treatments decisively determine the solid state properties. Here it is possible to favor wanted defects as well as to impede unwanted ones in order to create systems of distinct properties.

For metallic thin films, the change in the magnetic moments of atoms near the interface may cause novel magnetic properties. In insulators, the absorption spectrum changes with particle size, which may be essential to the conversion of light energy. Depositing ultra-hard substances as thin films onto appropriate supports opens new perspectives of wear-resistant components in engineering.

Multilayer systems show interesting anomalies of elastic behavior that have not yet been understood. Further progress in the field of solids of reduced geometrical dimensions will imply far-reaching consequences as to the various fields of application including, e.g., magnetic information storage, sensorics, the use of solar energy as well as micro- and opto- electronics. Fundamental research to be performed in the Institute of Microstructure Physics aims at a better understanding of the relations between structure and specific properties of the solid state systems under investigation. This presupposes a close connection of experimental activities as to preparation, structure analysis and property determination, on the one hand, with the theoretical understanding, on the other. The methods of structure determination above all imply electron microscopy as well as electron- and ion optical procedures of surface analysis.

In the following, some of the fields to be investigated in the Institute of Microstructure Physics will be given:

- structure formation and properties in inhomogeneous thin film systems as well as in small particles
- solid state reactions in micrometer and nanometer ranges
- molecular processes on crystal surfaces and formation of atomic layer structures
- crystal defects in semiconductors and their electrical effects
- crystal defects and mechanical properties
- interface structure and characteristics of compound systems
- electron microscope structure analysis for solid state investigations in the nanometer range

There are 100 co-workers in the employ of the Institute of Microstructure Physics. In addition, there are researchers working on projects or financed by foundations, Ph.D. and diploma students, and guests. There is a close co-operation with the Department of Physics of the Martin Luther University of Halle-Wittenberg and with other research establishments at home and abroad. In particular the treatment of related topics is agreed upon with the Max Planck institutes of metal research and solid state research as well as with the Fritz Haber Institute of the Max Planck Society.

The experimental departments of the Max Planck Institute of Micro-structure Physics will be organized to the fields of microstructure research and thin films. The theoretical department not yet fixed on a certain sphere of activity is to get engaged in an original field that will highly and diversely influence the experimental departments.

The tasks will be continued of training and further educating scientists in the field of electron microscopy previously carried out at the former Institute of Solid State Physics and Electron Microscopy within the framework of the International Centre of Electron Microscopy.

The Institute of Microstructure Physics has provisionally been presided by the body of Professors Dr.Dr.H.c.H. Fischmeister and Dr. M. Rühle (both from the Max Planck Institute of Metal Research, Stuttgart), Dr. J. Kirschner and Dr. J. Heydenreich (Max Planck Institute of Microstructure Physics, Halle).

{end of description of #067}

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**#068 Max-Planck Institute for Colloid and Interface Research**  
Max-Planck Institut für Kolloid- und Grenzflächen-Forschung  
Kant Straße 55  
D/O-1530 Teltow-Seehof  
Telephone: +49 (3328) 351-46-372

also located at:  
Rudower Chaussee 5, Haus 9.9  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6762-615

and at:  
Chemnitzer Straße 40  
D/O-9200 Freiberg (Sachsen)  
Telephone: +49 (3731) 70-407

General remark based on ad hoc information from various sources:  
The Max-Planck Institute for Colloid and Interfacial Research is to be composed of several departments which, so far, are still located at three different sites. A new building has been suggested, its locality is still unknown. The directing group consists of Prof.M.Kahlweit, Prof.K.L.Kompe, Prof.H.W.Spiess; there is a group of administrative advisors: Prof.Burkhart Philipp and Prof.G.Kretschmar, the first one located in Teltow, the second one in Berlin-Adlershof. The number of employees is estimated at about 100, among them about 38 scientists, to be augmented by soft-money workers, stipendiates and Ph.D. students.

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To reach Prof. Dr. M. Kahlweit, use the following address:  
Max-Planck Institut für Biophysikalische Chemie  
Karl-Friedrich-Bonhoeffer Institut  
Postfach 22841  
D/W-3400 Göttingen-Nikolausberg  
Telephone: +49 (551) 201-1  
Telefax: +49 (551) 201-754 or 201-318  
Telex: 96786 mpibpc d

**#068\*K3JAN91\*** Max-Planck Institute for Colloid and Interfacial Research

Research objectives: Broad-based, interdisciplinary colloid research which should ultimately include a theoretical and three experimental departments (structure, physics, and chemistry).

**#068\*IOCT92\*** Max-Planck-Institute für Kolloid-und Grenzflächenforschung (Max-Planck-Institute for Colloid and Interface Research)

The institute was founded on 01 January 1992. At present it is distributed over three institutes of the former East German Academy of Sciences in Berlin-Adlershof, Teltow-Seehof (near Potsdam), and Freiberg in Sachsen (Saxonia). Its mailing address is that at Teltow-Seehof as given above.

The provisional directors are Profs. Kahlweit, Kompa, and Spiess, all from West German Max-Planck-Institutes. The institute will have a staff of about 100 employees, 40 of whom will be scientists. It will be divided into four departments: a theoretical group, two physical experimental groups, and one chemical experimental group.

The actual fields of research in each of these four departments will depend on their future four directors. Their appointment is in progress, and will be decided upon early 1993. This will also include the decision on the final location of the institute in Eastern Germany. Because this requires a new building, the institute is expected to go into full operation in about five years.

{end of description #068}

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## Chapter 6.2:

### MAX-PLANCK WORKING GROUPS

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**#070 Max-Planck Working Group "Quantum Chemistry" at the Humboldt-University Berlin**

Max-Planck Arbeitsgruppe "Quanten-Chemie" an der Humboldt-Universität Berlin

Rudower Chausse 5

D/O-1199 Berlin-Adlershof

Telephone: +49 (30) 6704-5631 or -2366

Telefax: +49 (30) 6775-521

Director: Dr.habil. Joachim Sauer

It does not seem to be determined whether this Working Group will remain in Berlin, the University of Rostock and the University Potsdam have also been quoted as a locality.

Partnership Institute: Max-Planck Institut für Festkörperforschung, Stuttgart

**#070\*K3JAN91\* Max-Planck Working-Group "Quantum Chemistry"**

Research objectives: Dr. Sauer, quantum chemist, year 1949, formerly head of the research group of the Central Institute for Physical Chemistry of the Academy of Sciences of the German Democratic Republic has made important contributions to the application of quantum theory on questions of the catalytic properties of zeolite.

The main objective of his working group is the theoretical investigation of structures and properties of solid materials and their surfaces, as well as the investigation of elementary processes involving solid materials and their surfaces.

Emphasis will be placed on the area of metal research and the heterogeneous catalysis. As to methods, an integration of quantum chemical ab-initio methods with methods of the computer modelling is attempted. This will facilitate the treatment of systems with large distortions or non-existent periodicity.

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**#071 Max-Planck Working Group "Theory of Semiconductors with Reduced Dimensions" at the Humboldt-University Berlin.**

Max-Planck Arbeitsgruppe "Theorie dimensions-reduzierter Halbleiter" an der Humboldt-Universität Berlin  
Hausvogtei Platz 5-7  
D/O-1086 Berlin  
Telephone: +49 (30) 2037-7512  
Telefax: +49 (30) 2612-035

Head: Dr.habil.Robert Zimmermann  
Partnership Institute: Max-Planck Institut für Festkörperforschung, Stuttgart

**#071\*K3JAN91\* Max Planck Working Group "Theory of Semiconductors with Reduced Dimensions"**

Research objectives: The theoretical physicist, Dr. Zimmermann, year 1942, has dealt in his first studies optical properties of excitons in semi-conductors, especially with the theory of highly stimulated semi-conductors. His work on electron-hole-plasma and the dynamic shield of the excitons on plasma-molt-transition has found wide attention. His working group is to be involved especially with the theory of miniature dimensional semi-conductors.

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**#072 Max-Planck Working Group "CO<sub>2</sub> Chemistry" at The Friedrich-Schiller University, Jena**

Max-Planck Arbeitsgruppe "CO<sub>2</sub> Chemie" an der Friedrich-Schiller Universität Jena  
Lessing Straße 12  
D/O-6900 Jena  
Telephone: +49 (3641) 82-25560 or 82-25562  
Telefax: +49 (3641) 82-25062 or 82-25561

Head: Dr.habil.Eckhard Dinjus  
Partnership Institute: Max-Planck Institut für Kohlenforschung, Mülheim/Ruhr

**#072\*K3JAN91\* Max-Planck Working Group "CO<sub>2</sub> - Chemistry"**

Research objectives: The chemist, Dr. Dinjus, year 1939, became known for his work on CO<sub>2</sub> activation on transitional metals. His working group will be occupied with the synthesis of highly functional organic bonds, and with the setting of CO<sub>2</sub> on heterogeneous resp. carrier-fixed catalysts as well as with the interaction of substrates with transitional metals.

**072\*Q1AUG92\* Max-Planck Working Group "CO<sub>2</sub> Chemistry", response to "Questionnaire" described above in chapter 1.3: (language slightly modified by the author of this REPORT):**

## 1. General Survey

- 1.1. Max-Planck-Gesellschaft, Arbeitsgruppe "CO<sub>2</sub>-Chemie"  
(address and phone, fax, see above)
- 1.2. Jena - next airports: Erfurt (40 km), Leipzig (100 km), Berlin (250 km), Nürnberg (250 km), München (450 km)  
The group "CO<sub>2</sub>-Chemie" has its laboratories in the Institute of Technical Chemistry (same mailing address)
- 1.3. The group is a scientifically independent group of the Max-Planck-Society (financed by MPG: Partner institut: Max-Planck-Institut f. Kohlenforschung, Mülheim a.d. Ruhr) Basis: Cooperation contract between Max-Planck-Gesellschaft, München; Friedrich-Schiller-Universität, Jena; and the land government Thüringen, Thuringia)

After 5 years (1997/98) the group will again be a part of the Chemical Faculty of University Jena (planned)

Title of responsible head: Arbeitsgruppenleiter (position C3 or C4 professor) Name: Dr.rer.nat.habil.Eckhard Dinjus

- 1.4. Personnel: 5 scientists, 4 technicians (Chemical Engineer, chemical technician, laboratory assistants, 1 secretary); 6-8 graduate students (PhD candidates with the rank of Diplom-Chemiker, working 2 to 3 years); 2-3 post-doc stipendiates; 1 scientist (as a guest, abroad); 2-3 scientific support personnel, some students preparing for the Diplom degree.

The budget per year is approximately 1 million deutschmarks; additional "soft money" for 2-3 fellow ships is expected.

## 2. History

2.1. The Working Group has its roots in the Institute for Anorganic Chemistry of the Friedrich-Schiller University Jena in the Institute's department "Koordinations- und Elementorganochemie". In the early 1980's, the first efforts on the activation of CO<sub>2</sub> at transition-metal compounds began, based on investigations on the reaction of small, unsaturated organic molecules (olefine, alkaline, azomethine, aldehyde, ketone, hetero-olefine) with transition metallo-organic compounds or with transition metal complexes which are rich in electrons. During the 1980's these efforts were strongly continued. In 1987, in order to investigate scale enhancements, Dr. Dinjus changed to the Institute for Technical Chemistry. Both D. Walther and E. Dinjus have established their own groups which are in close cooperation.



2.2. In 1990/1991, E.Dinjus was a guest scientist at the Max-Planck Institute for Carbon Research (Institut für Kohlen Forschung). In the year 1989 it was forbidden to accept invitations. Within the scope of Promotion of Research in the New Länder, the Max-lanck Society founded - among others - the Working Group "CO<sub>2</sub> Chemistry" at the Jena University and Dr. Dinjus was appointed its leader. Begin of work: 01 January 1992, fully at work with new equipment: 01 September 1992. The continued and new tasks are briefly mentioned below under 3.

### 3. Research

#### 3.1. Scientific areas covered:

The research interest of the group lies in the evaluation of carbon dioxide as a raw material for organic syntheses. The use of carbon dioxide as a C1 building block in research laboratories and in industry is of great interest, both for economical and environmental reasons. Only a few examples for the use of carbon dioxide as a source of carbon are known, although many reactions resulting in an net incorporation of carbon dioxide into organic substances are thermodynamically feasible. The reason for this discrepancy lies in the high activation barrier for many reactions involving carbon dioxide owing to the relative inert character of the CO<sub>2</sub> molecule. Coordination of CO<sub>2</sub> to transition metal centers may, however, result in an activation of the carbon dioxide molecule and thereby lower the kinetic barriers for many reactions. Therefore, the activities of the group focus on transition-metal mediated and catalyzed reactions of carbon dioxide.

#### 3.2. Specific scientific activities:

There are three types of reactions of carbon dioxide that are investigated at the moment:

1. Insertion of CO<sub>2</sub> into metal carbon -bonds.
2. C-C coupling reactions between CO<sub>2</sub> and unsaturated organic substrates, i.e. alkynes, olefins, epoxides, etc.
3. Reduction of CO<sub>2</sub>.

The investigations include detailed preparative optimizations up to pilot plant scale e.g. catalytical 2-pyron synthesis from alkynes and CO<sub>2</sub>, catalytical lactone synthesis from diolefins and CO<sub>2</sub> and catalytical formation of formic acid from hydrogen and CO<sub>2</sub>. Methods are developed to control the chemo-, region- and stereoselectivity of this reactions. However, strong emphasis is also laid on elucidation of the mechanism of these reactions using labelling experiments and spectroscopical methods.

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3.3. Problems being worked on after 01 January 1992  
Activities in the following areas are planned in addition to the above mentioned projects:

1. Asymmetric synthesis involving CO<sub>2</sub> using chiral transition metal auxiliaries or catalysts.
2. Artificial photosynthesis.
3. Investigations to the insertion of CO<sub>2</sub> into C-H bonds (e.g. in Kolbe-Schmidt synthesis).

#### 4. German unification.

4.1. The Wissenschaftsrat (Science Council) and the Commission of Experts have given a positive evaluation of the scientific work and of the persons doing it, Drs. E.Dinjus and D.Walther. Continuing enlargement was recommended and accepted, by the Max-Planck Society as well as by the university.

4.3. Due to the restrictive policy of the former GDR hardly any contacts to the West came into being; we are very much interested to establish and nurture such contacts, in particular, with scientists in the USA.

Contacts to East-Block countries and scientists continue to exist. These contacts are not endangered by the possibilities for promotion by the European Community and the German Research Society (Deutsche Forschungs Gemeinschaft, DFG).

4.5. Scientists of this group kept their positions, additional scientists have been engaged. There is no need for support from the ABP (Arbeits-Beschaffungs-Program: the program of the West-German government to support for a limited time East-German scientists who have been laid off in the process of transition).

(end of institute description for #072)

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(#073, Max Planck Working Group on "Structural Grammar"  
Berlin - not described here)

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**#074 Max-Planck Working Group "Theoretical Multi-Particle Systems"**  
Max-Planck Arbeitsgruppe "Theoretische Vielteilchensysteme"  
Universitätsplatz 3  
D/O-2500 Rostock  
Telephone: +49 (381) 36 93 53  
Telefax: +49 (381) 34 28 7

Head: Prof. Dr. Gerd Röpke  
Partnership Institute: Max-Planck Institut für Kernphysik,  
Heidelberg

**#074\*K3JAN91\* Max-Planck Working Group "Theoretical Multi-Particle Systems"**

Research objectives:

The theoretical physicist, Prof. Röpke, year 1941, is well known through his work in the field of plasma, nuclear and heavy ions physics.

His working group is to be involved with the theoretical description of dense radioactive nuclear matter. Such hot nuclear matter occurs in astrophysical objects, but it can also be produced in the laboratory with the reaction of high-energy ions.

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The following group #075 was intended to be a Max-Planck Working Group but so far (Oct 92) has not yet been established. Instead it is working in the scientific fields as described below as a Group under KAI eV (see REPORT Part A, chapter 4.2.2) in the scope of the Kai WIP = "Wissenschaftler Integrations Program" ( $\approx$  Integration Program for Scientists).

**#075 Working Group "Regulation of DNA-Replication with Bacillus Subtilis"**  
Arbeitsgruppe "Regulation der DNA-Replikation bei bacillus subtilis"; Institut für Mikrobiologie  
Friedrich-Schiller Universität  
Beutenberg Straße 11  
D/O-6900 Jena  
Telephone: +49 (3641) 85-3151  
Telefax: +49 (3641) 85-2252  
Telex: 588 624

Head: Prof. Dr. Detlev Behnke

**#075\*K3JAN91\* Max-Planck Working Group "Regulation of DNA-Replication with Bacillus Subtilis"**

Research objectives:

The biologist, Prof. Behnke, year 1950, detected a new group of plasmids (annular hereditary material) at staphylococci which can

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be transmitted to bacilli and will show there a mechanism of augmentation of the introduced hereditary information until now unknown. Prof. Behnke's working group will explain this mechanism and examine whether the plasmids are suitable for a gen transfer to specific bacteria.

**#075\*IAUG92\*** The following partial description may serve as an example:

**Molecular analysis of the replication region of plasmid plP501**

The replication of three structurally and segregationally stable plasmids originally isolated from various streptococcal species is being investigated in *Bacillus subtilis*. These broad host range plasmids belong to the incompatibility group inc18 and replicate via the theta mechanism. They have been used successfully for the construction of stable cloning vectors for Gram-positive bacteria.

The DNA sequence of the replication region of plasmid plP501 has been determined (1) and the DNA sequence of the replication region of plasmid pSM19035 has been revised (2).

By in vitro and in vivo transcriptional studies three active promoters have been detected within the replication region of plP501: pl, directing the transcription of the copR-mRNA, pll, directing the transcription of the essential repR-mRNA and pll1, initiating the transcription of an antisense RNA (RNA111) that is complementary to part of the repR-mRNA (3).

Mutational and deletional analysis within the RNA111/promoter pll1 region allowed to propose a working model on copy number control of plP501 in *B. subtilis* (4). Three components (CopR, RNA111, an inverted repeat upstream of pll) act on two control levels to regulate the amount of the initiator protein RepR, which has been shown to be the rate limiting factor for plP501 replication (5) in *B. subtilis*.

An extended deletional analysis of the plP501 replication region led to the localization and functional characterization of the minimal in vivo active replication origin oriR (6). It was shown that only two plasmid components - RepR and oriR - are essential and sufficient to drive autonomous replication of plP501 in *Bacillus subtilis*.

**References:**

1. S. Brantl, A. Nowak, D. Behnke, and J.C. Alonso: Revision of the nucleotide sequence of the *Streptococcus pyogenes* plasmid pSM19035 repS gene. Nucl. Acids Res. Vol. 17:10110 (1989).
2. S. Brantl, D. Behnke, and J.C. Alonso: Molecular analysis of the replication region of the conjugative *Streptococcus agalactiae* Plasmid plP501 in *Bacillus subtilis*. Comparison with plasmids pAM81 and pSM19035. Nucl. Acids Res. Vol. 18: 4783-4790 (1990).
3. S. Brantl, B. Nuez, and D. Behnke: In vitro and in vivo analysis of transcription within the replication

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region of plasmid pIP501. Mol. Gen. Genet. (1992b), in press.

4. S. Brantl, and D. Behnke: Copy number control of the streptococcal plasmid pIP501 occurs at three levels. Nucl. Acids Res. Vol. 20: 395-400 (1992a).
5. S. Brantl, and D. Behnke: The amount of RepR protein determines the copy number of plasmid pIP501 in B. subtilis. J. Bacteriol. (1992c), in press.
6. S. Brantl, and D. Behnke: Characterization of the minimal origin required for replication of the streptococcal plasmid pIP501 in Bacillus subtilis. Mol. Microbiol., in press.

(end of description #075)

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**#076 Max-Planck Working Group "Enzymology of the Peptide Bond"**  
Max-Planck Arbeitsgruppe "Enzymologie der Peptidbindung" an der  
Martin-Luther Universität Halle-Wittenberg.  
Weinbergweg 16  
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Telephone: +49 (345) 61 72 86

Head: Dr. habil. Gunter S. Fischer  
Partnership Institute: Max-Planck Institut für Biochemie,  
Martinsried bei München

**#076\* K3JAN91\* Max-Planck Working Group "Enzymology of the Peptide Bond"**

Research objectives:

The biochemist, Dr. Fischer, year 1943, discovered a few years ago a new class of enzymes which accelerate the cubical convolution of low albumin chains (poly-peptide chains) to protein. The mechanisms of this catalytic process as well as the physiological role of the acceleration shall be explored by the working group "Enzymology of the Peptide Bond".

**#076\* INOV92\* ENZYMOLOGY OF THE PEPTIDE BOND**

The peptide bond as a structural motif is of paramount importance in biochemistry. Understanding its properties and its reactivity has to be considered as a prerequisite for the chemical explanation of numerous biological phenomena. Within this context, the "imino acid" proline represents a special case. As a secondary amino function, its -amino group forms part of a pyrrolidine ring. For this reason, any peptide bond formed with the N-terminal of a proline residue is of particular interest. Due to steric hindrance, its conformational behavior and chemical reactivities exhibit a number of differences in comparison to a normal peptide bond. Investigations on these surprising properties are an essential task of our group.

Since all conformational interconversions of the bonds adjacent to a proline residue are relatively slow, they may be rate-limiting in several processes involved in biological regulation. The cis/trans interconversion of the prolyl peptide bond provides an example of a bond rotation whose relaxation time ranges between 10 and 1,000 seconds. The interaction between target molecules and different conformations of proline-containing oligopeptides (including peptide bond and proline mimics) seems to indicate some conformational specificity.

Peptidyl prolyl cis/trans isomerases (PPlases) are ubiquitous enzymes. The exploration of their special role is a prerequisite to understand the influence of conformational isomerism on biological regulation. Investigations about the equipment of organisms and tissues with these enzymes are an important topic within the work of our group.

Enzymes catalyzing conformational interconversions allow, as an interesting model reaction, to deregulate a conformational recognition of cellular components simply by PPlase inactivation. The binding, within the cell, of cyclosporin A or FK506 to a subset of these enzymes results in a variety of effects. Most remarkably, the monoclonal expansion of T-lymphocytes after stimulation is prevented due to an impaired lymphokine gene expression. In pathogenic bacteria, knocking out a subset of PPlase genes leads to a decreased infectivity towards host cells.

Insights into the catalytic mechanism of these enzymes may provide us with powerful tools to characterize their cellular targets.

#### **Isolation and characterization of eukaryotic and prokaryotic PPlases**

G. Küllertz, J. Rahfeld, D. Hübner, B. Ludwig, S. Meyer, S. Wöllner, G. Fischer (in collaboration with J. Hacker, Würzburg)

The assay of PPlase activity by means of isomer-specific chymotryptic proteolysis using chromogenic peptides is rather time-consuming and lacks the necessary substrate variability. In order to overcome these disadvantages, we have developed a kinetic system based on the application of a microplate-reader. The most fascinating property of this novel assay equipment is the opportunity to measure simultaneously and within a few minutes the first-order rate constants of 96 fractions of, e.g., a protein fractionation experiment. A further improvement could be achieved by increasing the number of helper proteases used here. Thrombin and various subtilisins permit the measurement of substrates containing Arg, Lys, Ala, and Leu residues C-terminally to proline.

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Another approach measures the kinetic constants of PPlases toward non-chromogenic substrates and utilizes to this end the 2D-NMR NOESY technique. Using human calcitonin as a potential substrate for pig kidney cyclophilin-like PPlase, it could be shown (i) that the 32 residue polypeptide with two prolines is present in three different conformations which interconvert slowly on the NMR time scale, and that each of the conformers has a population > 5%; (ii) that the exchange rate between the conformers can be catalyzed by the PPlase, and (iii) that the internal proline is targeted by the enzyme, whereas the Pro-32 residue cannot be accelerated in its cis/trans interconversion rate. With the exception of the less well characterized folding intermediates occurring during the protein refolding reaction, calcitonin represents the largest polypeptide chain so far, where PPlase catalysis could be observed and investigated.

The equipment of the pathogenic organism *L. pneumophila* with PPlases has also been investigated. At least three different enzyme proteins could be detected. Among them, the Mip gene coded protein is of particular interest because knocking out the gene leads to an impaired infectivity of the bacteria toward macrophages. This protein was prepared from both the pathogenic organism and, in recombinant form, from *E. coli*. The mature recombinant protein lacks 20 N-terminal residues due to a putative signal peptide cleavage. A comparison of the proteins is under way to detect differences caused by posttranslational modifications. Either protein exhibits PPlase activity with a subsite specificity slightly different from human FK506 binding PPlases. In each case, the enzymatic activity is powerfully inhibited by FK506.

G. Fischer, H. Bang, B. Ludwig, K. Mann, J. Hacker: *Mol. Microbiol.* 6, 1375-1383 (1992).

#### **Synthesis and conformational properties of prolyl peptide bonds, proline mimics and peptide bond surrogates**

M. Schutowksi, D. Hübner, G. Fischer (in collaboration with K. Neubert, Halle)

The activities within this project aim at investigating the substrate specificity of prolyl cis/trans isomerases toward a series of tetrapeptide-4-nitroanilides where the amino acid residue in position P1', usually occupied by proline, was altered with respect to ring size and ring substituents. It was demonstrated that both ring size and ring structure influence the rate of the non-enzymatic cis/trans isomerization. Heteroatoms in the 4-position of the proline ring decrease the activation energy of rotation considerably. The same effects could be observed with derivatives bearing either a 4-membered ring or a 6-membered ring within the peptide chain. Because of the high rate constants, the

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conventional assay for PPlases based on isomer-specific proteolysis has failed. To overcome this situation, we plan to use the magnetization transfer technique in NMR.

In addition, we are interested in the modification of the peptide backbone itself, especially in the replacement of an amide O-atom by an S-atom which leads to the so called endothiono-peptides (IUPAC calls such a displacement a thioxo-de-oxo-bisubstitution). This substitution seems to be a minimal variation (isosteric replacement). The prolyl peptide bond could be successfully thionated in a tripeptide moiety due to the reaction with YOKOHAMA's reagent. A number of proline-specific proteases can utilize thionoacyl-prolyl substrates. The turnover rate constants, however, are generally low. Interestingly, the prolyl bond-thionation can decrease the rate constant of cis/trans interconversions about 80 fold in aqueous solution. Our efforts are directed towards extending the peptide chain of thionoprolyl peptides to get substrates which can be recognized by PPlases.

D. Hübner, T. Drakenberg, T. Forsen, G. Fischer: FEBS Lett: 284, 79-81 (1991).

D. Hübner, B. Hartrodt, E. Kleinpeter, D. Ströhl, W. Brandt, H. Schinke, M. Wahab, G. Fischer: Biophys. Biochem. Res. Commun. 177, 271-278 (1991).

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#077 Max Planck Working Group on Environmental Law,  
not described

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#078 Max-Planck Working Group "Dust in Star-Forming Regions"  
Max-Planck Arbeitsgruppe "Staub in Sternentstehungsgebieten"  
an der Universität Jena  
Schillergäßchen 2  
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Telefax: +49 (3641) 42-5039  
Telex: 588 634 uni dd  
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#078/02

29 OCT 92

Head: Dr.Th.Henning

Partnership Institute: Max-Planck Institut für Radioastronomie,  
Bonn

**#078\*K3JAN91\*** Max Planck Working Group "Physics and Chemistry of  
Interstellar Dust in Star Generation Regions"

Research objectives:

The physicist and astronomer, Dr. Hennig, has successfully worked in the field of "Star Formation and Interstellar Dust", one of the most acute topics of astrophysics. His working group will participate in the interpretation of measurements in the infrared range - the thermal dust grains originated radiation grains is one of the most efficient probes for the examination of cold condensations of interstellar matter from which stars will be formed.

**#078\*Q1JAN92\*** (Questionnaire as filled in by the Group:)

1.1. Max-Planck-Gesellschaft, Arbeitsgruppe "Staub in Sternentstehungsgebieten" an der Universität Jena. (Address etc., see above).

1.2. The institute which harbors the working group is placed in the center of Jena. The town has more than 100000 residents, and is located at the river Saale. Jena can be reached by car using the highway A4. Access by train is given through the lines München-Berlin as well as Frankfurt/Main-Dresden. The nearest airport is at the capital of the land Thüringen, Erfurt.

1.3. The working group of the Max-Planck society is located in the buildings of the University Observatory Jena (Department of Physics and Astronomy of the Friedrich Schiller Universität). The protector of the working group is the MPI for Radioastronomy Bonn. The group started to work at 1 JAN 1992. The inner structure of the group is characterized by three subgroups; one subgroup concentrates on theoretical aspects of interstellar dust (dust models, radiative transfer, light scattering), another one is dedicated to laboratory work (spectroscopy and production of cosmic dust analogues), and the third is involved in astronomical observations (infrared spectroscopy and mapping, millimeter continuum and line observations). The responsible head of the MPG working group is Dr.rer.nat.habil. Thomas K. Henning.

1.4. The group will involve seven scientists, three persons are involved in solving technical problems. The group has about five positions for Ph.D. candidates, a few post-doc positions, and two positions for guest scientists. Two persons belong to the support staff. About five fellow-workers are expected in addition.

1.5. It is not intended by the group to publish an own journal. On the other hand, the group will prepare and carry out scientific

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workshops and conferences especially in collaboration with the University Observatory. We are preparing a preprint series.

2.1. The group has been founded due to the initiative of the current leader. The scientific profile is influenced by the long-term research history of the University Observatory. The main field of this institute has been over a long time the investigation of interstellar matter.

3.1. The scientific work of the group will concentrate on the inter-relationship between dust and star-formation. On the theoretical side, the processes of dust grain formation and evolution in different interstellar environments will be investigated. This includes the fractal properties of such particles as well as the optical behavior, which is an important clue to astronomical observations. The description of interstellar grains and their interaction with the surroundings (gas, radiation field) is a basic input to models of radiation transport. These models also include assumptions on the geometry of young stellar objects which are characterized at early stages by the presence of dust disks or haloes. Using models of radiation transport we will describe the spectral appearance, the intensity distribution, and the polarization properties of young stellar objects. The models will be confronted with spectroscopic data of fine grains produced in our laboratory. In addition, we will gather data at various observatories. Doing the observations we attempt to get a nearly complete coverage of the electromagnetic spectrum, yielding as much information as possible on the sources of radiation. Therefore, we propose to carry out observations using satellites (e.g. ROSAT, ISO) for wave-lengths not accessible from ground. Other observations are done at optical, infrared, and radio observatories all over the world. Especially, we will use the ESO and IRAM facilities, the Effelsberg telescope, and the SMT located in Arizona and presently near completion.

4.1. Due to the recent foundation of the working group it has not been evaluated by the Wissenschaftsrat. However, the council of the Max-Planck-Gesellschaft evaluated the proposal for this group, and decided to found it.

4.2. The equipment of the group is appropriate for the research tasks. The group owns several UNIX workstations, and a number of PCs. A VAX will be purchased soon. Software for dust grain modelling, radiation transfer, and astronomical data reduction is running. With the construction of new telephone lines the communication difficulties still present will vanish. We may be reached by FAX; a direct E-mail access is planned. The group has access to main journals and publications by sharing the library of the university observatory. There are funds to purchase books and conference proceedings. Also, to account for travel expenses an amount of money is granted to the group.

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4.3. The group will develop a broad scientific collaboration with colleagues working on similar fields. Members of the group attend international conferences, and will have longer stays at various research institutes. This holds especially for Ph.D. candidates. We will try to maintain the scientific contacts to colleagues in the former Soviet Union.

5. Of course, we are willing to collaborate with US scientists. ONR Europe could support our activities by funding smaller workshops with these colleagues, and providing our group with information on travel grants for younger scientists. We would like to take part in American programs concerning the investigation of cosmic dust (e.g. NASA programs) and small solid particles. Any information on such programs is welcome.

(end of description #078)

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**#079 Max-Planck Working Group "Gravitational Theory"**

Max-Planck Arbeitsgruppe "Gravitationstheorie"  
an der Friedrich-Schiller Universität  
Theoretisch-Physikalisches Institut  
Max-Wien Platz 1  
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Telefax: +49 (3641) 82-223445  
e-mail: dieter.ruder@physik.uni-jena.dbp.de

Head of Group: Prof. Dr. Gernot Neugebauer  
Partnership Institute: Max-Planck Institut für Astrophysik,  
Garching bei München (Munich)

**#079\*K3JAN91\* Max Planck Working Group "Gravitational Theory"**

**Research objectives:**

The theoretical physicist, Prof. Neugebauer, year 1940, is a renowned specialist in the field of thermodynamics and general relativity theory. His working group will emphasize the study of the thermodynamics of compact rotating stars and black holes, the structural formation in the early universe and the light deflection by non-homogeneous distribution of mass (gravitational lenses).

**#079\*Q1JAN92\*** (The answers for our questionnaire as provided by the Group; for questionnaire refer to chapter B 1.3 of this REPORT):

1.1. Max-Planck-Gruppe "Gravitationstheorie" an der Friedrich-Schiller-Universität Jena (Max Planck Group "Gravitational Theory" at the Friedrich Schiller University Jena)  
(for address etc. see above)

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1.3. The Max Planck Group belongs to the Institut of Theoretical Physics which is a part of the Faculty of Physics and Astronomy of the Friedrich Schiller University. The partner institution of the group is the Max Planck Institute of Astrophysics in Garching near München (Munich). The head of the Max Planck Group is Professor Dr. Gernot Neugebauer.

1.4. 2 + 3 scientists, 1 technician, 1 secretary, 4 graduate students, 1 administrative official, 1 guest scientist

1.5. no

2.1. The Max Planck Group is new. It is founded, however, in the tradition of a well-established relativity group at the Institute of Theoretical Physics.

3.1. ^G exact solutions of Einstein's field equations

^G rotating bodies in general relativity

^G relativistic thermodynamics

^G gravitational lenses

3.3. (b) numerical relativity

4.2. During the time of the GDR travels to the West were forbidden for some of the scientists. This, and also the availability of computer systems has changed now completely. The support from the Max Planck Society allows for a sufficient availability of computers.

4.3. There are many relations to scientists of former East-Block countries. We are trying to keep these contacts up.

4.5. Probably no scientist of the Institute of Theoretical Physics will lose his job next year. However, the number of permanent positions is reduced (more than 50 Prozent).

(end of description for #079)

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**#080 Max-Planck Working Group "Molecular and Cellular Physiology"**  
Max-Planck Arbeitsgruppe "Molekulare und zelluläre Physiologie" an  
der Friedrich-Schiller Universität Jena  
c/o Medizinische Fakultät  
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Telephone: +49 (3641) 82-0  
Telefax: +49 (3641) 42-5039

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#080/02 - #083/01  
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Head: vacant

Partnership Institute: Max-Planck Institut für biophysikalische Chemie, Göttingen

**#080\*K3JAN91\*** Max Planck Working Group "Molecular and Cellular Physiology"

Research objectives:

The physician and mathematician, Prof. Nilius, year 1945, is a highly distinguished researcher in the field of the dynamic physiology of the heart. His working group is to examine the role of those ion channels which permit the entry of calcium in the cellular walls of blood vessels, thus participating in the translation of many physiological functions (regulation of vessel contraction, increase of smooth muscle cells, activation of blood cells).

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**#081 Max-Planck Working Group "Non-classical Radiation".**

Max-Planck Arbeitsgruppe "Nichtklassische Strahlung" an der Humboldt-Universität Berlin

Haus 10.16

Rudower Chaussee 5

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Telefax: +49 (30) 7604-2384

Head: Prof.Dr. Harry Paul

Partnership Institute: Max-Planck Institut für Quantenoptik, Garching near München (Munich).

**#081\*K3JAN92\*** Max Planck Working Group "Non-classical Radiation"

Research objectives:

The physicist, Prof.Dr. Paul, year 1931, has been in the forefront of his field with his publications on the interaction of radiation with atoms and the quantum mechanical description of coherent rays. His working group is to develop a.o. the spectral (sectoral) distribution of laser and maser sources with the most advanced methods available as well as examine quantum mechanical measuring processes.

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**#083 Max-Planck Working Group "Mechanics of Heterogeneous Solid Bodies"**

Max-Planck Arbeitsgruppe "Mechanik heteorgener Festkörper" an der Technischen Universität Dresden

Hallwachs Straße 3

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Telefax: +49 (351) 4659-544

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#083/02

22 OCT 92

Head: Prof. Dr. Fischmeister

Partnership Institute: Max-Planck Institut für Metallforschung,  
Stuttgart

#083\*K3JAN92\* Max Planck Working Group "Mechanics of Heterogeneous Solid Bodies"

Research objectives:

The physicist, Prof. Dr. Wolfgang Pompe, year 1942, has been in his work instrumental to the progress of laser application. His working group is to examine a.o. the fracture propagation in heterogeneous materials (e.g. fiber and interlaminating materials) when subjected to mechanical and thermal intermittent loads.

#083\*M6AUG92\* Max Planck Working Group "Mechanics of Heterogeneous solid Bodies"

Research objectives

Contributions to the theoretical materials science with emphasis on:

Static continuum mechanics of heterogeneous solid bodies

Non linearity and structure formation

Theoretical modelling of interfaces and thin layers

Besides establishing a theory and evaluation

One scientific goal is the construction and evaluation of theories. In a narrowly defined area a fine resolution mechanical experiment in the nanometer range is to be evaluated (raster tunnel and atom energy microscopy with mechanical and thermal load (ps-laser)).

Focal points of research:

The following topics will be taken up respective to their material science problems:

Structure-property relations of structural ceramics

Thermo shock behavior and thermal fatigue

Nano crystalline materials

Bio materials

The following partial problems will be treated in depth:

Integral tensions and crack propagation:

Expansion of the theory of integral tensions

Stochastic rupture theory

Break resistant hardstoff layers through nano structuring

Interface and thin layers:

Mechanical behavior of supra micrometer thin layers

Stability of reaction- diffusion layers

Photo induced mass transport at surfaces

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**Structural formation:**

General regularities of the irreversible Laplace's growth  
Key-lock-effect of interfaces

**Ht-behavior**

Stable (motion resistant) structures of grain interfaces in  
ceramical material (? true translation doubtful)

{end of description #083}

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**#085 Max-Planck Working Group "Cell Division Regulation and Gene Substitution"**

Max-Planck Arbeitsgruppe "Zellteilungsregulation und  
Gensubstitution" an der Humboldt-Universität zu Berlin  
Max-Delbrück Haus  
Robert Rößle Straße 10  
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Telefax: +49 (30) 946-3306

**Head: Dr.habil. Michael Strauss**

Partnership Institute: Max-Planck Institut für Biochemie,  
Martinsried bei München (Munich)

**#085\*K3JAN92\* Max Planck Working Group "Cell Division Regulation and Gene Substitution"**

**Research objectives:**

The molecular biologist, Dr. Strauss, year 1950, is engaged a.o. in  
the examination of the regenerative processes of liver tissue,  
based on molecular and cell biological methods.

**#085\*INOV92\* GENE REPLACEMENT AND REGULATION OF CELL DIVISION**

In Spring 1992, the unit Gene Replacement and Regulation of Cell  
Division was established as a "Nachwuchsgruppe\*". Part of the  
previous projects will be continued, others will be finished and  
new ones will be taken up. Prior to the reorganization of the  
group, our research was related to the development of a new gene  
expression system for mammalian cells based on bacteriophage T7 RNA  
polymerase and promoters as well as on the role of papovaviral T  
antigens and tumor suppressor genes in malignant transformation and  
immortalization. The latter aspect became part of a new project  
which is in the process of being established.

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\*) about "young-wood group"

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The current research program is devoted to the development of a basic strategy for gene replacement in liver cells. This includes studies on the regulation of cell division in hepatocytes with special emphasis on the role of tumor suppressor genes, gene transfer by retroviral vectors, and investigations on homologous recombination in hepatocytes. In addition, studies on liver regeneration in vivo and organoid formation in vitro have been initiated. The ultimate goal of these studies is an evaluation of realistic possibilities for somatic gene therapy ex vivo, based on a detailed knowledge of the molecular processes characteristic for liver regeneration. Transgenic animal models are being developed for genetic diseases (alpha 1-antitrypsin deficiency) and for liver cancer (retinoblastoma protein deficiency). These animal models are based on inactivation of gene expression by antisense mechanisms and will be used for gene replacement.

Studies on the normal regulation of cell division in hepatocytes will be complemented by investigations on transforming functions of tumor viruses and particularly of hepatitis B virus. This project requires the establishment of differentiated human hepatocytes and will be carried out in collaboration with the Department Virus Research.

#### **Gene expression in mammalian cells using the phage T7 transcription machinery**

A. Lieber, V. Sandig, S. Bähring, W. Sommer

In an attempt to create a highly specific expression system for foreign genes in mammalian cells we used the RNA polymerase of bacteriophage T7 to express genes from a T7 promoter. Efficient transcription in stably transformed cell clones was detected after modifying the polymerase by fusing a nuclear localization signal to its N-terminus. Rather unexpectedly, however, we detected a considerable level of basic transcription from the T7 promoter in the absence of T7 polymerase. This is due to an initiator-like function of the T7 promoter for RNA polymerase II. We have used mutagenic oligonucleotide synthesis in connection with affinity selection to clone mutant T7 promoters which have reduced activities with polymerase II.

This expression system is applied to the development of retroviral vectors and packaging lines. In addition, different techniques will be applied to regulate the expression and activity of T7-RNA polymerase.

A. Lieber, U. Kiessling, M. Strauss: Nucleic Acids Res. 17, 8485-8493 (1989).

A. Lieber, V. Sandig, S. Bähring, W. Sommer, M. Strauss: Methods in Enzymol., in press (1992).



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#085/03  
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#### **Immortalization of human cells**

M. Strauss, D. Bauer (in collaboration with B.E. Griffin, RPMS, London)

Human fibroblasts, epithelial cells, and sinusoidal endothelial cells were successfully immortalized in our laboratory by overexpressed large T antigen from polyoma virus. Using the glucocorticosteroid-regulated MMTV promoter, reversibility of the immortalized phenotype can be achieved, suggesting that it is dependent on the continuous expression of T antigen. Attempts are being made to induce reversible immortalization in human adult hepatocytes. At the same time, we are searching for cellular targets of large T antigen.

M. Strauss, S. Hering, L. Lübke, B.E. Griffin: *Oncogene* 5, 1223-1229 (1990).

S. Hering, B.E. Griffin, M. Strauss: *Exptl. Cell Res.* 195, 1-7 (1991).

#### **Stimulation of cell division by antisense mechanisms**

A. Lieber, H. Müller, V. Sandig, M. Hellman

Using antisense oligodeoxyribonucleotides, we have demonstrated that repression of the synthesis of the retinoblastoma susceptibility gene product p105-Rb results in a dramatic stimulation of cell division and in a shortening of the cell cycle in formal human fibroblasts. However, cells do not become transformed or immortalized automatically. The transformation frequency as measured by growth in soft agar is relatively high ( $10^{-4}$ ) in comparison with normal cells. We are interested to find out if increased mutagenesis in protooncogenes or other tumor suppressor genes is responsible for this effect which could be the consequence of fast replication and insufficient time for repair. On the other hand, we are using this antisense effect to stimulate cell division in hepatocytes. Antisense RNA and ribozyme-expressing constructs are also being applied to achieve long term effects.

M. Strauss, S. Hering, A. Lieber, G. Herrmann, B.E. Griffin, W. Arnold: *Oncogene* 7, 769-773 (1992).

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### **Gene transfer into differentiated hepatocytes**

D. Bauer, V. Sandig, I. Kirillowa (associated), H. Müller

Gene replacement in liver cells in vitro as part of a strategy for gene therapy suffers from the inability of differentiated hepatocytes to divide. We have recently established a clone of differentiated mouse hepatocytes which is a revertant from cells transformed by SV40 large T antigen. This clone exhibits most if not all parameters of normal hepatocytes, but the cells are able to divide slowly. Using this clone, we are establishing protocols for efficient gene transfer by retroviral vectors and by transfection. Cells expressing human alpha 1-antitrypsin are used for transplantation into the liver or spleen of normal congenic mice. This cell clone also serves as recipient for studies on homologous recombination. In addition, we have initiated attempts to establish differentiated human hepatocytes.

### **Animal models for liver diseases**

S. Rahm (associated group member), D. Bauer (in collaboration with D. Paul, Hannover)

Animal models are required for studies on gene therapy which investigate transplantation of cells corrected in vitro as well as gene transfer in vivo. We are currently using a strategy based on antisense RNA expression in transgenic mice. Focusing on the liver, we are using the albumin promoter/enhancer to drive the expression of the antisense sequences. Current models are the alpha 1-antitrypsin gene and the retinoblastoma gene. The latter offers not only the possibility to establish dividing cells from transgenic mice but may also serve as a model for predisposition to liver cancer (human HCC are often linked with the loss of Rb function).

### **Mechanism of homologous recombination**

H. Müller, M. Gotthardt

Homologous recombination frequencies depend on several factors including syngeneity, length of the homology regions, and the presence of DNA strand breaks. Assuming the latter to be the main rate-limiting factor, we have designed a strategy to target the induction of strand breaks to a particular sequence in the genome where homologous recombination should take place afterwards. Cell synchronization will help to identify the most suitable state in the cell cycle for introducing foreign DNA.

{end of description #085}

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**#086 Max-Planck Working Group "Modulation of the Signal Transduction of Growth Factors"**

Max-Planck Arbeitsgruppe "Modulation der Signalübertragung von Wachstumsfaktoren" an der Friedrich-Schiller Universität Jena

Löbder Straße 3

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Telefax: +49 (3641) 82-22345

Head: Dr.habil. Reinhard Wetzker

Partnership Institute: Max-Planck Institut für Biochemie,  
Martinsried bei München (Munich)

**#086\*K3JAN92\* Max Planck Working Group "Modulation of the Signal Control of Growth Factors"**

Research objectives:

The biochemist, Dr. Reinhard Wetzker, year 1949, investigates a.o. the primary structure and function of enzymes which participate in the receptor relays of specific cells.

**#086\*INOV92\* SIGNAL TRANSDUCTION OF GROWTH FACTORS**

Cellular growth in higher organisms is regulated by a number of growth factors with activating or inhibiting effects on cell proliferation. Growth factors attain the cell through the extracellular space and bind to specific receptors of the plasma membrane. The growth signal will then be transduced to the targets inside the cell. The passage of the proliferation message through the cellular membrane is a critical step on the way from the sources to the targets of the signal. In the membranes, the proliferation signal will be transformed and thereafter dissociated - obviously in order to regulate several cellular functions in parallel. These functions include not only the replication of DNA and the activation of selected genes, but also the supply of energy, alterations of the cytoskeleton, and other molecular processes necessary for cellular division.

Our specific interests are directed at two types of phosphorylation reactions intimately involved in the propagation and transformation of growth factor signals within the plasma membrane: the phosphorylation of tyrosine residues of membrane-bound and cytosolic proteins, and the phosphorylation of the membrane-lipid phosphatidylinositol. In both reactions, the amount of phosphorylated product transducing the initial growth signal is determined by kinases and phosphatases. The coordinated regulation of these classes of enzymes by growth signals is poorly understood. The projects of our group (founded in April 1992) are aimed at better understanding of these processes.

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### **Signalling by protein tyrosine phosphorylation**

F.D. Böhmer, X. Luo, J. Celler, M. Kovalenko

Many growth factor receptors are endowed with a protein tyrosine kinase activity which is ligand-stimulable, tyrosine-specific and essential for transduction of the mitogenic signal. Activation of receptors as a consequence of ligand binding leads to autophosphorylation of the receptor molecules and thereby generates binding sites for downstream signalling molecules. Protein-tyrosine phosphatases (PTPases) hydrolyze phosphotyrosine residues and this reaction probably represents a major mechanism of (negative) regulation within growth factor receptor signalling.

Recent experiments suggest the existence of distinct receptor-directed dephosphorylation mechanisms for epidermal growth factor (EGF) and platelet-derived growth factor (PDGF) receptors in Swiss 3T3 cell membranes. Further work is dedicated to the identification and characterization of PTPases presumably involved in these processes. Furthermore, cellular as well as microbial and synthetic modulators of receptor tyrosine kinases and PTPases will be investigated.

R. Grosse, F.D. Böhmer, P. Langen, A. Kurtz, W. Lehmann, M. Mieth, G. Wallukat: *Meth. Enzymol.* 198, 425-437 (1991).

### **Signal transfer by phosphorylation of phosphatidylinositol**

R. Wetzker, T. Hanck, P. Häusler, B. Stoyanov

Phosphatidylinositol (PI) is a minor lipid of the plasma membrane which acts as a source of numerous messenger substances. Growth factors affect several reactions of the PI metabolism including the phosphorylation of the lipid in 3-, 4- or/and 5-position of the inositol moiety.

Part of our work is directed at the mechanism of the regulation of PI 4-kinase by growth factor receptors. Recently, we purified this key enzyme of phosphoinositide metabolism in collaboration with Justin Hsuan from the Ludwig Institute for Cancer Research in London. Currently we are dealing with the cloning of the enzyme. Recent in vitro results obtained in our laboratory point to a modulation of the activity of PI 4-kinases isolated from human erythrocytes and A 431-cells by tyrosine phosphorylation. The present investigations are aimed at a detailed characterization of this effect.

A similar approach is planned for the phosphatidylinositol 4-phosphate (PI 4-P) phosphatase. PI 4-P-phosphatases act antagonistically to the corresponding kinases and are therefore of

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equal importance for the net production of the messenger substance.

Supported in part by the DFG (We 1565/1-1 and-2)

R. Wetzker, R. Klinger, J. Hsuan, M.J. Fry, A Kauffmann-Zeh, E. Müller, H. Frunder, M. Waterfield: Eur. J. Biochem. 200, 179-185 (1991).

{end of description #086}

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**#087 Max-Planck Working Group "Pharmacological Hemostaseology"**  
Max-Planck Arbeitsgruppe "Pharmakologische Hämostaseologie" an der  
Friedrich-Schiller Universität Jena  
c/o Friedrich Schiller Universität  
Fürstengraben 1  
D/O-6900 Jena  
Telephone: +49 (3641) 82-0  
Telefax: +49 (3641) 42-5039

Head: Dr. habil. Götze Nowak  
Partnership Institute: Kerckhoff-Klinik, Bad Nauheim

**#087\*K3JAN92\*** Max Planck Working Group "Pharmacological Hemostaseology"  
Research objectives:  
The physician, Dr. Nowak, year 1944, is engaged to realize for the application for the clinical practice the results of the hirundinea, a substance isolated from the saliva of leeches, which inhibits blood clotting.

**#087\*IAUG92\*** Center of interest: Mechanisms of control of coagulation during a septic shock, and pharmacological possibilities for controlling the disturbed coagulation and fibrinolysis.

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**#088 Max-Planck Working Group "X-Ray Diffraction of Laminal Systems"**  
Max-Planck Arbeitsgruppe "Röntgenbeugung an Schichtsystemen" an der Humboldt Universität zu Berlin  
Hausvogtei Platz 5 - 7  
D/O-1086 Berlin  
Telephone: +49 (30) 2037--7441  
Telefax: +49 (30) 2612-035

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Head: Dr. Rolf Köhler  
Partnership Institute: Max-Planck Institut für Festkörperforschung,  
Stuttgart

**#088\*K3JAN92\* Max Planck Working Group "X-Ray Diffraction of Laminar Systems"**

**Research objectives:**

The physicist, Dr. Rolf Köhler, year 1942, is carrying out a.o. x-ray structural investigations on epitactically grown layers of gallium arsenide and related mix-crystals resp. of silicon germanium alloys.

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**#089 Max-Planck Working Group "Theory of Complex and Correlated Electron Systems"**

Max-Planck Arbeitsgruppe "Theorie komplexer und korrelierter Elektronensysteme" an der Technischen Universität Dresden

Helmholtz Straße 20

D/O-8027 Dresden

Telephone: +49 (351) 4659-380

Telefax: +49 (351) 4659-500

Head: Dr.habil.Helmut Eschrig

Partnership Institute: Fritz-Haber Institut der Max-Planck Gesellschaft, Berlin

**#089\*K3JAN92\* Max Planck Working Group "Theory of Complex and Correlated Electron Systems"**

**Research objectives:**

Dr.habil Helmut Eschrig, year 1942, is engaged with the theoretical description of local effects of the electron-grid-reaction in high temperature-super conductors, magnetic systems and metal-semiconductor transition.

**#089\*M6AUG92\* "Theory of Complex and Correlated Electron Systems"**

**Research Objectives:**

Theoretical description of the electric structure, the connections (in German: Bindungsverhältnisse), the dynamics and the collective phenomena of condensed matter.

Contribution to problems whose microscopic understanding is yet poorly developed:

- The inclusion of local correlations in the theory of density functions, especially the inclusion of orbital magnetic polarization,
- the study of magnetostatic effects,
- the inclusion of d- and f- electron shells in a molecular dynamics free of parameters,
- inter-relations between field-theoretical and quantum-chemical accesses to the theory of condensed matter.

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These topics (and especially the microscopic description of magnetic and highly-correlated systems) have become more relevant by recent experimental investigations in relation to the high-temperature superconductors, and in relation to adsorbed metal surfaces on semiconductors and metallic substances.

**Focus of Research:**

- Study of local effects of the electron correlation and the electron-grid interaction, of the magnetism and the transport based on the theory of density function and based on quantitative theoretical restriction of the electronic structure.
- High-temperature superconductors, magnetic systems with d- and f-shells, and strongly irregular systems in the vicinity of the transition from semiconductor to metal, metal adsorbed layers on semiconductor surfaces.
- Development of a method of parameter-free molecular-dynamic description of heavy atoms, especially of transition metals and rare earth.

{end of description #089}

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**#090 Max-Planck Working Group "Failure Tolerant Calculation"**

Max-Planck Arbeitsgruppe "Fehlertolerantes Rechnen" an der Universität Potsdam

Kur Straße 33

D/O-1086 Berlin

Telephone: +49 (30) .....

Telefax: +49 (30) ....

Head: Prof.Dr. Michael Gössel

Partnership Institute: Max-Planck Institut für Saarbrücken

**#090\*K3JAN92\* Max Planck Working Group "Failure Tolerant Calculation"**

**Research objectives:**

The research done by the mathematician Prof. Dr. Gössel comprises also the optimization of failure recognition in circuits with the help of "self tests".

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**#091 Max-Planck Working Group "Algebraic Geometry and Number Theory"**

Max-Planck Arbeitsgruppe "Algebraische Geometrie und Zahlentheorie" an der Humboldt-Universität zu Berlin

Mohren Straße 39

D/O-1086 Berlin

Telephone: +49 (30) 20-3770

Telefax: +49 (30) 20-04975

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Head: Prof.Dr.Helmut Koch  
Partnership Institute: Max-Planck Institut für Mathematik, Bonn

**#091\*K3JAN92\* Max Planck Working Group "Algebraic Geometry and Number Theory"**

Research objectives:

The mathematician Prof. Dr. Koch, year 1932, is engaged a.o. with problems of modern algebraic number theory and the related problems of algebraic geometry.

=====

**#092 Max-Planck Working Group "Partial Differential Equations and Complex Analysis"**

Max-Planck Arbeitsgruppe "Partielle Differentialgleichungen und komplexe Analyse" an der Universität Potsdam

Mohren Straße 39

D/O-1086 Berlin

Telephone: +49 (30) ....

Telefax: +49 (30) ....

Head: Prof.Dr.Bert-Wolfgang Schulze

Partnership Institute: Max-Planck Institut für Mathematik, Bonn

**#092\*K3JAN92\* Max Planck Working Group "Partial Differential Equations and Complex Analysis"**

Research objectives:

The mathematician Prof. Dr. Schulze, year 1944, examines a.o. problems of analysis with partial differential equations involving multiple results (? "Mannigfaltigkeiten") with singularities.

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**#093 Max-Planck Working Group "Non-Linear Dynamics (in Astrophysics)"**

Max-Planck Arbeitsgruppe "Nicht-lineare Dynamik (in der Astrophysik)" an der Universität Potsdam

Stubenrauch Straße 26

D/O-1590 Potsdam

Telephone: +49 (331) 77-138

Telefax: +49 (331) 75--105

Head: Dr.habil. Jürgen Kurths

Partnership Institute: Max-Planck Institut für Extraterrestrische Physik, Garching bei München (Munich)



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**#093\*K3JAN92\* Max Planck Working Group "Non-Linear Dynamics (In Astrophysics)"**

Research objectives:

The range of research of the mathematician Dr. Kurths, year 1953, includes a.o. problems of magnetic and radiation hydrodynamics, of turbulence, and gravitational systems.

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**#094 Max-Planck Working Group "X-Ray Optics"**

Max-Planck Arbeitsgruppe "Röntgen-Optik" an der Friedrich-Schiller Universität Jena

Max-Wien Platz 1

D/O-6900 Jena

Telephone: +49 (3641) 82-22519

Telefax: +49 (3641) 23843

Head: Dr.habil.Eckhart Förster

Partnership Institute: Max-Planck Institut für Quantenoptik, Garching bei München (Munich)

**#094\*K3JAN92\* Max Planck Working Group "X-Ray Optics"**

Research objectives

The physicist, Dr. Förster, year 1944, examines a.o. the extension of the range of application of x-ray optics with curved crystals to a larger wave length range through the use of synthetic crystals from multi layers.

**#094\*IAUG92\* Working group "X-ray Optics" of the Max Planck Society at the Friedrich Schiller University, Jena**

The working group x-ray optics has been established on 01 April 1992 at the Friedrich-Schiller University by the Max-Planck Society. Thematically and instrumentally the group is related to the goals of the institute for optics and quantum electronics, one of the major experimental institutes of the physical-astronomical department. The working group is engaged with an important section of x-ray optics and spectroscopy, the preparation and the use of plane and bent crystals as reflecting, frequency selective and imaging elements.

The area of x-ray optics has considerably grown in importance and scope. After a forced development of synchrotrons, high performance lasers for the production of high temperature plasma in the x-ray field as well as pulsed discharges (e.g. plasma focus) there are now available intensive x-ray resources. New methods for the treatment of materials, the production of fine structures and the application of thin layers allow the development and the construction of high precision x-ray optical elements. These elements constitute the building parts operating in each x-ray optical arrangement as they allow to focus, collimate or analyze the radiation.

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A major area of research for this group is the use of spherical and toric bent crystals in x-ray optics which serve for the investigation of dense, laser created high temperature plasma, a further area deals with the use of crystal monoliths for the absolute measurement of x-ray wave lengths in connection with the metric system. In the future, the possible use of x-ray flash resources for a real time diffractometry is planned.

Further possibilities for the application of x-ray optical methods include the time resolved examination of biological and medical preparations, the satellite x-ray astronomy, basic experiments for the realization of x-ray lasers for industrial use, i.e. the x-ray lithography.

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**#095 Max-Planck Working Group "Time Resolved Spectroscopy"**

Max-Planck Arbeitsgruppe "Zeitaufgelöste Spektroskopie" an der Universität Leipzig

Permoser Straße 15

D/O-7050 Leipzig

Telephone: +49 (341) 2392-2317

Telefax: +49 (341) 2392-2317

Head: Dr.habil.Ortwin Brede

Partnership Institute: Max-Planck Institut für Strahlenchemie, Mülheim/Ruhr

**#095\*K3JAN92\* Max Planck Working Group "Time Resolved Spectroscopy"**

Research objectives:

The chemist, Dr. Brede, year 1941, is engaged a.o. with the examination of the quick chemical reactions in fluid and frozen solutions.

**#095\*M6AUG92\* Max Planck Working Group "Time Resolved Spectroscopy"**

Research objectives:

Use of short term spectroscopic methods of the electron pulse radiolysis and the laser flash photolysis with proof of transient changes through optical emission- and absorption spectroscopy or through electron spin resonance spectroscopy for the examination of chemical elementary reactions and reaction mechanisms carried by reactive particles (e.g., solvatised electrons, ions, electronically charged molecular conditions, radicals)

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**Research emphasis:**

The working group disposes of short term electroscopic methods of the electron pulse radiolysis and the laserflash fotolysis each of which can be combined with the time resolved proof of transient material changes through optical emission - and absorption spectroscopy or through electron spin resonances spectroscopy. In this instance, the time factor of the instruments available at the present time involves a few nano - resp. microseconds.

With the above mentioned methods chemical elementary reactions and reaction mechanisms are examined which are resolved by charged particles (e.g., solvatised electrons, anions, cations, electronically charged molecular states, radicals. The working group has specific experiences with the analysis of transient processes in organic systems.

At present attention is focussing on the following problems:

- Mechanisms of (oxidative) breakdown of polymers
- Effect of antioxidants and other stabilisators
- Radical cation chemistry (carbon hydrogen, heterocyclen)
- Dynamic processes in fluids, especially mechanisms of electron transfer processes
- Radiation initiated oxidation processes at models of biological membranes

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**#096 Max-Planck Working Group "Complex Catalysis"**

Max-Planck Arbeitsgruppe "Komplexe Katalyse" an der Universität Rostock

Buchbinder Straße 2 - 6

D/O-2500 Rostock

Telephone: +49 (381) 36-371

Telefax: +49 (381) 23-467

Head: Prof.Dr.Günther Oehme

Partnership Institute: probably: Max-Planck Institut für Kohlenforschung, Mühlheim/Ruhr

**#096\* K3JAN92\* Max Planck Working Group "Complex Catalysis"**

Research objectives:

A.o. the catalytic transformation of alkaline, alkenes and unsaturated molecules which are created as by-products of technical processes in high-level organic compounds.

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#096\*IOCT91\* {the following report was submitted in the month of October 1991 by Prof.Oehme to the Ministry of Cultural Affairs (Kultusministerium) of the land Mecklenburg-Vorpommern}

Central Institute of Organic Chemistry (ZIOC)  
of the (former) Academy of Sciences of the GDR  
Division of Complex Catalysis  
Head of Division: Prof. Dr. Günther Oehme

#### History and scientific tasks

As proposed by Professor Langenbeck and Professor Rienäcker, the Institute of Catalysis Research, Rostock, was built in the years 1950-1952 and inaugurated in November 1952.

The erection of this first new building of a scientific institute in the GDR may certainly be attributed to the competence of these scientists who started to successfully investigate the phenomenon of organic and inorganic catalysis already before their appointment as professors at the Rostock University.

The importance of this branch of chemistry, which has remained unchanged both for the basic research and for the application in the chemical industry was realized by both scientists already at that time.

At the time of its foundation the Institute of Catalysis Research was a modern research institute and, according to its conception it is the oldest institution in Europe. The directors appointed were Prof. Dr. Langenbeck, head of department of "Organic Catalysis", and Prof. Dr. Rienäcker being head of department of "Inorganic Catalysis".

Since 1954, the institute has been subordinated to the German Academy of Sciences, Berlin.

In 1959, as a result of the increasing actuality of this direction of research, the two departments of anorganic and organic catalysis became independent institutes. The Institute of Anorganic Catalysis Research headed by Prof. Rienäcker moved to Berlin-Adlershof. The Institute of Organic Catalysis Research headed by Prof. Langenbeck remained in Rostock and was enlarged according to the importance of the organic catalysis. At that time the main fields of research were:

1. Investigation of the catalytic features of enzyme models, chelate complexes and peptides,
2. Investigations of base-catalyzed stereochemical reactions,
3. Heterogeneous mixed-salt catalysis for hydrogenation reactions.

In 1966, Dr.habil.H.Pracejus was appointed head of the Institute of Organic Catalysis Research. A short time later, in September 1967, this institute was incorporated into the Central Institute of Organic Chemistry of the German Academy of Sciences. These changes, which took place within the framework of the reformation of the academy, were also connected with fundamental changes of the scientific profile aimed at combining practice

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-oriented and relevant scientific research in the field of coordination-chemical catalysis. Main fields were C-C-coupling reactions, such as oligomerizations of lower olefins and acrylic acid derivatives as well as dehydrodimerizations of aromatic compounds and, later, the development of highly-active catalysts for the low-pressure polymerization of ethylene.

From the very beginning of the work in complex catalysis the immobilization of highly-active homogeneous catalysts was given priority. Only at the end of the seventies it became possible to use the rich experience in the field of asymmetric synthesis gathered in previous years. The cooperation with VEB "Pharmazeutisches Kombinat Germed" covered syntheses and tests of many new homogeneous and immobilized catalysts on the basis of rhodium phosphine, -phosphinite and -aminophosphine-phosphinite complexes. The synthesized complexes were used for asymmetric hydrogenation. In this connection, from 1978 to 1985 the development and production of DOPA was realized together with the VEB "Isis-Chemie Zwickau" (combinatorial preparation Isicom since 1986).

Prof.Dr.G.Oehme has been appointed head of department since the death of Prof.Dr.H.Pracejus in 1987.

Successful research concepts were continued. In spite of an increasing part of cooperation with the chemical industry, a sound basic research was carried out in the fields of

- immobilization of optically active, homogeneous catalysts for hydrogenation reactions
- preparation of unusual amino acids by asymmetric hydrogenation
- enantioselective C-C-coupling reactions
- course of enantioselective catalytic reactions in colloidal phases
- photochemically assisted cocyclizations of acetylene and nitriles to pyridine derivatives catalyzed by cobalt(I)-complexes
- structure-reactivity relations of nickel-acetylene complexes used as catalysts for cyclization of substituted acetylenes
- synthesis of chiral phases for GC and HPLC analyses
- development of highly active Ziegler-Natta catalysts for ethylene polymerization.

Furthermore, local institutions and industrial factories were supported in the field of environmental control.

From the present point of view, the importance of catalytic research has increased. Nearly all modern chemical processes are dependent on highly active catalysts. In Germany, especially in the "Max-Planck Institut für Kohlenforschung" in Mülheim, problems of the metal complex catalysis in homogeneous phases are being dealt with. Furthermore, the foundation of a professorship for catalytic research at a representative German college is envisaged at present.

{There is, in addition, an 18-page description in German, including the above English text and many references available from the authors}

{end of description #096}

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**#097 Max-Planck Working Group "Asymmetric Catalysis"**

Max-Planck Arbeitsgruppe "Asymmetrische Katalyse" an der  
Universität Rostock  
Buchbinder Straße 5 - 6  
D/O-2500 Rostock  
Telephone: +49 (381) ask under 36-371  
Telefax: +49 (381) try via 23-467

Head: Dr.habil.Jürgen Selke  
Partnership Institute: Max-Planck Institut für  
Kohlenforschung, Mühlheim/Ruhr

**#097\*K3JAN92\* Max Planck Working Group "Asymmetric Catalysis"**

Research objectives:

The research work of the chemist, Dr. Selke, year 1934, includes a.o. the synthesis with chiral catalysts in order to selectively transfer the chiral information of small quantities of a catalyst to larger amounts of a reaction product (e.g. a medicine) thus creating a form of a product which is biologically effective.

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**#098 Max-Planck Working Group "Synthesis, Structure, and Properties of Liquid Crystal Systems"**

Max-Planck Arbeitsgruppe "Synthese, Struktur und Eigenschaften von flüssigkristallinen Systemen" an der Martin-Luther Universität Halle-Wittenberg.

Haus der Francke'schen Stiftungen  
Mühlpforte 1, or: Robert-Franz-Ring 9 (temporary housing)  
D/O-4020 Halle (Saale)  
Telephone: +49 (345) 28773 or 25081  
Telefax: +49 (345) 649065 UNI/HALLE/Zentra  
Telex: 4253 unihal dd

Head: Prof.Dr.Alfred Saupe  
Partnership Institute: Max-Planck Institut für Polymerforschung,  
Mainz

**#098\*K3JAN92\* Max Planck Working Group "Synthesis, Structure, and Properties of Liquid Crystalline Systems"**

Research objectives:

The physicist, Prof. Dr. Saupe, year 1925, examines a.o. the structure and the properties of non-conventional, ferroelectric and vitreous liquid crystals.

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#098\*Q1OCT91\*

QUESTIONNAIRE FROM: Max Planck Working Group on Synthesis,  
Structure and Properties of Liquid-Crystalline Systems

TOWN: Halle (Saale)

DOMAIN: Chemistry

MAILING DATE: 28 OCT 91

received on: 05 DEC 91

Origin.Language: English

translated on: n/a

computerized on: 10 DEC 91

(modification of language)

## 1. GENERAL SURVEY

### 1.1. Address, Telephone, etc. (see above)

### 1.2. Setting, Environment, Access

The Institute is in downtown Halle (Saale), in walking distance from the Marktplatz.

### 1.3. Organization, Structure, Hierarchy

This group belongs to the Institute of Physical Chemistry of the Chemistry Department. The head of the group will be Prof.Dr. Alfred Saupe.

### 1.4. Employees

The head of the group, 2 permanent coworkers, 7 candidates for a doctor's degree, 2 technicians, and 1 administrative official.

### 1.5. Institute Publications, Host Conferences: No own ones

## 2.HISTORY

### 2.1. Long-Term History, Founding, Tradition

1694 Foundation of the Martin-Luther University Halle-Wittenberg

1834 Foundation of the autonomous Institute of Chemistry.

Famous chemists: Georg-Ernst Stahl (1660-1734), Jacob Volhard (1834-1910), Daniel Vorländer (1867-1935), Karl Ziegler (1898-1973; Nobel-Prize Winner), F.Sauerwald (1894-1966).

W.Langenbeck (1899-1967). - The research in the field of liquid crystals in Halle has a long history). The liquid crystalline state was discovered in 1888, and the

specialized study began in 1900, founded in Halle by D.

Vorländer. Before 1940, 90% of all known liquid crystalline materials were synthesized in Halle.

### 2.2. Recent History

Since 1955, this research was continued by H.Sackmann, later by H.Schubert, D.Demus, and H.Zaschke. Most important results:

- Essential contribution to the polymorphism of liquid crystals.

- On the base of the miscibility a generally accepted classification and nomenclature of calamatic liquids crystalline phase types was introduced.

- By x-ray investigations, it was shown that this system of phase types corresponds to a structure system.

- Study of the relation between molecular structure and physical properties (study of phase transitions; optical, dielectric, electrooptical, rheological measurements).

### 3. RESEARCH

#### 3.1. General Areas Covered

- Synthesis of new liquid crystalline materials (nematic and smectic substances for the use in electrooptical devices, substances with new phase types, substances with non-conventional structure, e.g., with lateral or terminal branches; polymeric liquid crystals)

- Structure investigations of liquid crystalline phases by x-ray diffraction methods

- Study of the role of intermolecular interaction (dipoles, hydrogen bonds, electron-donor-acceptor interaction, repulsive forces) on the structure and properties of liquid-crystalline phases, especially mixed phases, e.g. induced smectic phases, "reentrant" phases, biaxial nematic phases, cubic phases)

- Electro-optics of smectic liquid crystals

- Theoretical studies of field-induced deformations in nematic and smectic liquid crystals on the basis of elasticity theory.

#### 3.2. Specific Scientific Activities

Members of Editorial Advisory Boards of the most important journals:

*Molecular Crystals and Liquid Crystals:* Prof. Sackmann  
Prof. Saupe

*Liquid Crystals:*..... Prof. Demus  
all of this institute.

### 4. GERMAN UNIFICATION, TRANSITION

#### 4.2. Special Problems

In the period of the GDR, there were large problems in regard to travel from East to West, availability of sufficient computer systems; in particular regarding the availability of certain scientific instruments. - An improvement is already visible in regard to travel and to computer systems, but so far not for basic research equipment or for high-level instruments.



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#### 4.3. International Contacts

-The Liquid Crystal Group had close contacts to numerous institutions in East and West, in part on the basis of contracts:

Institute of Crystallography Moskva (Moscow)  
Lomonossow-University Moskva (Moscow)  
Institute of Physics of the Hungarian Academy of  
Sciences, Budapest  
Institute of Physics of the Bulgarian Academy of  
Sciences, Sofia  
Institute of Physics of the Czechoslovakian Academy of  
Sciences, Prague  
Jagellonian University Krakov, Poland  
Max-Planck Institut für Polymerforschung, Mainz, FRG  
Johannes-Gutenberg Universität, Mainz, FRG  
Technische Hochschule, Berlin Germany  
Gesamthochschule Paderborn, FRG  
Chalmers University of Technology, Göteborg, Sweden  
Raman Research Institute, Bangalore, India  
FOM Institute Amsterdam, The Netherlands.

The contacts, including those with the institutions in East-Europe will be continued.

{end of answers to questionnaire}

{end of description of #098}

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### Chapter 6.3:

#### (EAST-GERMAN) BRANCH INSTITUTES OF (WEST-GERMAN) MAX-PLANCK INSTITUTES -----

##### **#101 Branch-Institute Berlin-Adlershof of the Max-Planck Institute for Extraterrestrial Physics in München (Munich)**

Aussenstelle Berlin-Adlershof des Max-Planck Instituts für  
Extraterrestrische Physik in Garching bei München

Rudower Chaussee 5

D/O-1199 Berlin-Adlershof

Telephone: +49 (30) 6704-4381

Telefax: +49 (30) 6704-5084

Director: Dr. Rüstenbach

**#101\*INOV92\*** The "Außenstelle Berlin of the Max-Planck-Institut für  
extraterrestrische Physik" (Garching) performs space research and  
astronomy in three different areas:

- (1) space plasma theory.
- (2) in situ measurements of plasma and magnetic field  
parameters, and
- (3) x-ray astronomy.

The total number of employees is 24, out of which 19 are physicists  
and engineers. Prof. G. Haerendel acts as director.

Some details on ongoing and future research.

- (1) In plasma theory emphasis is on various aspects of plasma-  
plasma and plasma-dust interactions, instabilities and  
transport by chaotic motions. Topics are taken from the solar  
wind-martian ionosphere interactions, critical velocity and  
artificial plasma clouds experiments. Plasma instabilities  
are investigated in preparation of ELF wave-plasma flow  
correlation measurements planned for the tail probe of the  
Interbol mission. The role of chaotic electron motions in the  
Earth's magnetotail for the onset of substorms is another  
topic of theoretical research in this group.
- (2) Adaptive Langmuir probes have been flown on the Magion  
subsattellites of the Aktivny and APEX missions. The  
measurements are analyzed mainly with respect to the large-  
scale and irregularity structure of the subauroral topside  
ionosphere. The main experimental activity is concerned with  
magnetic field measurements in the neighborhood of planet  
Mars. This began with the Phobos missions and is to be  
continued on Mars 94/96, both on the orbiter and on the

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balloons. Furthermore, the group will participate in magnetospheric and tail research on EQUATOR-S and Relict II.

- (3) The astrophysics group participates in the Bragg-spectrometer for the X-ray telescope on the Russian Spectrum-X-Gamma mission and works on the theory of neutron stars.

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**#102 Branch Institute Berlin of the Max-Planck Institute for Plasma Physics in München (Munich)**  
Bereich Berlin des Max-Planck Institutes für Plasmaphysik in München  
Mohren Straße 41/42  
D/O-1086 Berlin  
Telephone: +49 (30) 20366-101  
Telefax: +49 (30) 20366-111

Director (acting): Prof.K.Pinkau  
Employees: 50

**#102\*ISEP92\*** Main fields of research:  
Special topics of nuclear fusion:  
    edge plasma physics  
    plasma/wall interaction  
    diagnostics.

A high-power plasma generator on the basis of a dc-discharge is installed in Berlin.

**#102\*INOV92\***

The Berlin Department of the Max-Planck-Institut für Plasmaphysik Garching was formed on 1 January 1992 mainly with the staff of the departments of Plasma-Wall-Interaction and Low Temperature Plasmas of the former Zentralinstitut für Elektronenphysik of the Academy of Sciences of the GDR.

The majority of staff members (total 25 scientists, 25 technicians) are directly involved in the experiments ASDEX UPGRADE and WENDELSTEIN 7-AS in Garching performing theoretical and experimental contributions to the

- power balance of plasma facing components
- near wall spectroscopy
- project WENDELSTEIN 7-X

The experimental basis in Berlin itself are a high power plasma generator (PSI-1) using a dc-arc discharge (Similar to the PI-SCES facilities at UCLA) and a UHV surface analysis laboratory.

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The PSI-1 device is designed to produce steady state plasmas in the parameter range  $n_e - 10^{18}-10^{20} \text{ cm}^{-3}$ ,  $T_e = 50-5 \text{ eV}$  similar to those in the edge region of magnetic fusion devices.

Main research topics will be

- experiments in the physics of plasmas near material surfaces (related to target plates and walls in fusion devices)
- testing of technological components for fusion devices
- development and testing of plasma diagnostics

The surface analysis laboratory (SIMS, AES, XPS, SEM and EDAX will be available in the near future) will serve to diagnose samples exposed to the fusion devices as well as to the PSI-1 facility. In collaboration with the Humboldt-University, students will be given the opportunity to graduate with contributions in the above mentioned fields of research related to nuclear fusion.

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MAIN CHAPTER 7:  
OTHER INSTITUTES

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contains:

- Chapter 7.1: Institutes of Federal Ministries
- Chapter 7.2: Institutes of Land Governments
- Chapter 7.3: Legally Private Institutes
- Chapter 7.4: Institutes in Special Arrangements
- Chapter 7.5: List of Universities

Chapter 7.1:

INSTITUTES OF FEDERAL MINISTRIES  
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The number of institutes run by individual federal ministries is large, and it is difficult to decide which ones may be of interest in the scope of this REPORT. In German, they often are listed under the name of "Ressort-Forschungs-Einrichtungen". This name indicates that they are generally restricted to a rather small area of scientific activities, which in nearly all cases is more dedicated to development and application than to basic research. For the eleven old länder of the FRG, a list of such institutes is given on pages 191-195 of F.Meyer-Kramer "Science and Technology in the Federal Republic of Germany" (Longman, Harlow, 1990), briefly described in Part A of this REPORT in chapter 3.3.

A certain exception, i.e. more interest in basic research, we find in the domain of the atmospheric sciences, done by the so-called Meteorological Observatories. After the discontinuation of the Observatory in Aachen (which was dedicated to atmospheric electricity), there remained two observatories in the FRG: in Hamburg and on the Hohenpeissenberg south-west of München (Munich). In the re-unification process, two Observatories were taken over from the GDR, the largest and most traditional one in Potsdam and a second one in Lindenberg, while a third one, in Wahnsdorf, was not continued. All the observatories (Hamburg, Hohenpeissenberg, Lindenberg and Potsdam), belong to the German Weather Service (Deutscher Wetterdienst) with its seat in Offenbach near Frankfurt(Main); a special Department for Research exists at the headquarters in Offenbach. The German Weather Service belongs to the Federal Ministry of Transport which supports basic research also in other institutions (e.g. the Hydrographic Institute in Hamburg), all in the old FRG. So far, according to our knowledge, no such institutes of the Federal Ministry of Transport have been founded in the five new länder.

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**#201 Meteorological Observatory Potsdam of the German Weather Service.**

Meteorologisches Observatorium Potsdam des Deutschen Wetterdienstes  
Telegrafenberg

Albert-Einstein Straße (upper end)

D/O-1561 Potsdam

Telephone: +49 (331) 316-0

Telefax: +49 (331) 316-501

Telex: 15433 mspdd (in house) or 15489 mhoppd (other institute near by).

**#201\*Q3OCT91\* METEOROLOGICAL OBSERVATORY POTSDAM OF THE GERMAN WEATHER SERVICE**

**1. GENERAL SURVEY**

1.1. Address, Telephone, etc.: {see above}

**1.2. Setting, Environment, Access:**

The Observatory is on top of the mountain "Telegrafenberg" in Potsdam (just south of the eastern end of the "Lange Brücke"), a wooded mountain on the slopes of which we also find buildings of other offices of the German Weather Service, buildings of the Astronomical and Astrophysical Institutes, the famous Einstein Tower for Solar Physics Research, and others. For access take the Albert-Einstein Straße which starts at the Brauhausberg Straße just south of the Heinrich-Mann-Straße at the eastern end of the Lange Brücke. From the top of the tower of the Observatory, a magnificent view on Potsdam and its environment is given.

**1.3. Organization, Structure, Hierarchy:**

The observatory is now an integral part of the Deutscher Wetterdienst (German Weather Service).

Acting director (Kommissarischer Leiter 1991): Dr. Spänkuch

Departments (approximate names and brief explanation of topics):

1. Digital Evaluation of Satellite Images ;

Department head: to be determined

2. Turbulence and Boundary Layer;

Department Head: Dr. Thomas Foken (phone extension: 316-515, home phone: 87725)

3. Land-Surface Processes;

Department Head: Dr. Spänkuch (phone extension: 316-500)

Problems similar to GEWEX; detailed program not yet determined, especially probably measurement (and development of measuring methods) for turbulent energy currents, including parameterization and model development.

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#### 1.4. Employees:

so far no Civil Servants, all are employees ("Angestellte"): Total about 39 among them 16 scientists, of these 7 are serving the Meteorological Station (24 hours, 7 days, plus "Springer" to fill in gaps in other Meteorological Stations) of the 16, 3 work at a different location: the Radiation- and Ozone Measuring Station Ravensberge.

#### 1.5. Institute Publications, Host Conference:

The Met.Obs used to publish (about 50% of their contents) in the "Veröffentlichungen" and the "Abhandlungen" of the Meteorological Service of the GDR; both series are discontinued. The Met. Obs. does not have an own series of publications but reports and similar material are being produced. Employees publish in the general scientific literature.

#### 2.HISTORY:

##### 2.1. Long Term History, Founding, Tradition:

The Meteorological Observatory Potsdam is the most traditional institution of its kind in Germany. It was founded, at the present place and building, in 1892. It's Guest Book, still the first one, carries the names of almost all famous meteorologists of the world of the last 100 years.

#### 3. RESEARCH (preliminary notes):

##### 3.1. General Areas Covered:

Basic and applied research on atmospheric science including measuring techniques and involving satellite data evaluation.

##### 3.2. Specific Scientific Activities:

Internationally known scientists from recent times: Dr. Skeib (who was for 25 years the director of the Met.Obs.), antarctic meteorology; Drs. Grasnick and Feister (ozone).

An activity of Dr. Spänkuch: Indirect Sounding, a.o. evaluation of satellite data to derive atmospheric parameters.

Activities of Dr. Foken: experimental; his Ph.D Thesis was on the determination of the temperature profile in the lowest millimeters over the ocean surface. Atmospheric Seeing: influence of lowest meters of the atmosphere on "seeing" through it, e.g. for "seeing" stars with an objective.

#### 4. GERMAN UNIFICATION, TRANSITION:

##### Wissenschaftsrat (Science Council):

The Wissenschaftsrat has evaluated, but the main points were already clear by then. About 50% of the scientists had to leave and did, many are still jobless today. Some of them may be reemployed by the various other institutes now planned for the Telegrafenberg complex.



4.2. Special Problems of an Administrative Character:

(a) concerning Department 3: As contribution of data for their basic research problems, in Potsdam long routine measurements of radiation and of ozone have been made. Within the Deutscher Wetterdienst, the responsibility for radiation measurements now rests with the Meteorologisches Observatorium Hamburg (Dr.Kasten), and for ozone with the Meteorologisches Observatorium Hohenpeißenberg in Bayern: attempts are being made to save at least the long-term measurement series in Potsdam if it turns out to be impossible to continue the basic research activities.

(b) Met.Obs.Potsdam used to have good and close contacts with colleagues in other countries of the Warsaw Pact; these are now all interrupted because Bonn does not grant any money for travel and other forms of cooperation. For example, Potsdam has investigated the land-surface processes in the GDR and other countries (e.g., Spain), it is now necessary to extend this eastwards to include the tundra but there are no funds available for such type of boundary-crossing work. The colleagues in Potsdam privately and personally try to keep their good contacts alive but this is not supported officially. There is the danger that valuable international relations will get lost.

(c) The computer problem is getting serious: the computer companies originally producing the computers (used in the Met.Obs) do no longer exist (especially "ROBOTRON" ceased to work). That means that spare parts (e.g. color ribbons for printers) or new extensions are not available; it is possible that some work must simply be terminated because the computing power will no longer be existing. The example of Sweden was quoted: it was stated that the Swedes send the computers they do not longer use to the Baltic States.

(d) Journals, books. This observatory hosted the national meteorological library of the GDR; but the Deutsche Wetterdienst library is at Offenbach, near Frankfurt/Main. The people in Potsdam hope that at least the archives can be kept and continued there. They get, in Potsdam, still the same journals they got before, but no new ones (except where directly needed for specific projects).

(e) Climate research , e.g. statistical on the duration of specific meteorological events and processes, will probably be terminated in Potsdam and go to Offenbach (Headquarters of German Weather Service).

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#### 4.3. International Contacts:

Dr. Spänkuch has been a member of the IAMAP Radiation Commission.  
Dr. Foken has good contacts with NCAR (group of Dr. Kaimal, visited again there in October 1992).

{end of description #201}

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#### **#202 Meteorological Observatory Lindenberg of the German Weather Service.**

Meteorologisches Observatorium Lindenberg des Deutschen Wetterdienstes.

D/O-1213 Lindenberg, Kr. Beeskow

General survey, based on information obtained from Observatory Potsdam:

The former Meteorological Service of the GDR maintained two more observatories, at Lindenberg and at Wahnsdorf.

The Meteorological Observatory at Lindenberg (in the Landkreis Beeskow, SE of Berlin) was founded 1912 with aerological meteorology as the main task (kites, balloons, later gliders, aircraft, radiosondes). These items were more or less discontinued about 1975 and the emphasis went on evaluation of satellite data (methods developed there!) and soundings with rockets. That, now, is also discontinued and plans seem to be to go back to aerology. This encounters some problems, because Lindenberg happens to be under the crossing point of two major airline routes. Of note is their work in aerology research in theory and with radiosondes, captured balloons, wind profilers, indirect soundings. The work by Leiderer and by Weller became known the world over.

## Chapter 7.2:

### Institutes of Land Governments -----

As stated in the opening remarks of the preceding chapter, the number of research institutes operated by individual ministries of governments is large; this is even more so for land governments than for the federal one. Again, their research is mostly close to application, but in this chapter we describe an exception: a land institute of world-wide fame, doing astronomical research.

**#301: Karl-Schwarzschild Astronomical Observatory**  
Karl-Schwarzschild Observatorium  
Dorf Straße 73  
D/O-6901 Tautenburg (Thüringen)  
Telephone: +49 (36427) 837  
Telefax: +49 (36427) 265  
Telex: 58584 ksot dd

Director: Prof.Dr.Siegfried A. Marx

**#301\*Q3OCT91\*** {Questionnaire filled in during visits and corrected by letter dated 10 Oct.91}:

**KARL-SCHWARZSCHILD OBSERVATORIUM = KARL SCHWARZSCHILD OBSERVATORY)**

#### 1. GENERAL SURVEY

1.1. Address, Telephone etc.: {see above}

#### 1.2. Setting, Environment, Access:

north of Jena, on road along river Saale, past Dornburg, small side-road right, Observatory is outside the small village Tautenburg. Coordinates: 50° 58' 51" N latitude; "Longitude": 0 hours, 46 minutes, 51 seconds east of Greenwich; height 331 m aSL.

#### 1.3. Organization, Structure, Hierarchy:

Leiter des Obs.: Prof. Dr. Siegfried A. Marx

#### 1.4. Employees:

at present 7 scientists, 11 technicians, 5 administrative;  
after 01 Jan 92: 10 scientist (other astronomical observatory in Sonneberg will probably dissolved and part of their scientists will come here), total 26.

1.5. Institute Publications, Host Conferences:  
Formerly No. 1 to 120 "Mitteilungen des  
K.S.Obs.Tautenburg", ad hoc, used also in exchange for  
foreign literature, distributed to about 250. Tried to  
continue, maybe to about 100 receivers.

1987 Workshop Astrophotography of the IAU (International  
Astronomical Union), Working Group meets all three  
years, proceedings edited here, published 1988 by  
Springer-Verlag.

## 2. HISTORY

2.1. Long Term History, Founding, Tradition:  
19 Oct 1960 founded as an All-German Institute  
Advisory Board = Kuratorium : 3 FRG and 3 GDR. Until  
1967. 1967 there was a reformation of the Academy by  
founding the "Central Institutes" and thereby  
Tautenburg became member of Zentralinstitut für  
Astrophysik.

Founding father of this institute was Prof. Hans Kienle,  
Heidelberg before 1960. Tautenburg: close to Zeiß, new  
cover of mirror, only possible at Zeiß/Jena. Danger that  
this is being destroyed, thereafter no such facility in  
Germany; hope that decision will be revised.

## 3. RESEARCH

3.1. General areas Covered:  
Bernhard Schmidt (born in Talinn, Estonia) 1885  
(see: S.A. Marx and Werner Pfau: "Himmelsfotografie mit  
Schmidt-Teleskopen", 1990 Urania Verlag, Leipzig, also  
1990 Springer Verlag Heidelberg; English to be edited  
by Cambridge University Press; including biography of  
Bernhard Schmidt, description of the telescope with  
many photographs). Ordered 29 June 1949 for Zeiß to  
build a Schmidt Telescope of 2 m mirror diameter, and  
free diameter of the collecting plate: 134 cm, the  
largest in the world. Without the collecting plate used  
for spectroscopic photography. Because of sky  
brightness: around new moon Schmidt system, around full  
moon spectroscopic system. Photoplates with Schmidt 24  
x 24 cm i.e. with a focal length of 4 m this  
corresponds to 3.5 x 3.5 degrees. The spectroscopic  
system (Coude System) has a focal length of 92 m.

Until now about 7000 photographs with Schmidt-System and  
more than 500 spectra with Coude System. Many plates  
have been evaluated in Potsdam and others in foreign  
countries.

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Evaluation here:

"Schmidt" are investigated systematically for minor planets (asteroids). They discovered 32 asteroids (first named Tautenburg). Annually 1500 positions observations delivered to Cambridge MA, Dr.Marsden, "Minor Planet Center".

Extragalactic Star Systems  
("Galaxies") investigation:  
chemical development of these systems;  
structures of galaxy clusters;  
existence of inter-galactic matter in these clusters.

With the spectroscopic system:  
stars are investigated which have strong magnetic fields, their magnitude and their structure on the stellar surface (e.g. at the sun: the sun spots); Zeeman Effect, but structure possible only with powerful electronic receivers.

3.2. Specific Scientific Activities:

Further development of photographic emulsion for astronomical purposes. Largest CCD chips are 4 cm x 4 cm, but 24 x 24 cm are needed, possible only with photographic methods.

3.3. Problems Being Worked on after 01 January 1992:

Not much change scientifically. Telescope will be fitted with electronic receiving systems, a work to be done in common with Max-Planck Institute for Astronomy in Heidelberg. It is desired to open the Observatory to all German astronomers, including students for theses. Guest rooms are available, and Jena university is close.

3.4. Future Scientific Problems Envisioned:

Image processing system for evaluation of the electronic receivers. This means that the technicians must either be exchanged or re-educated.

4. GERMAN UNIFICATION, TRANSITION

4.1 Wissenschaftsrat (Science Council):

WR has evaluated and recommended Tautenburg as institute of the land Thüringen.

4.2. Special Problems of an Administrative Character:

Founding Commission exists, chairman Frau Prof. Seitter, of the Astronomical Institute of the Münster University. First meeting was 12 Sept., next 14 October 1991.

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Re-Foundation 01 Jan 1992 is the goal. Land government cooperates very well.

4.3. International Contacts:

Good contacts existed to USSR and Bulgaria. With Bulgaria sound, maybe even be improved, but with USSR problems.

Good contacts with Austria. With USA rather little contacts because in the GDR there was the official "reluctance" versus contacts with the USA.

4.4. Scientific Problems Abandoned after 01 Jan.92: none

5. SPECIFIC PROBLEMS, POTENTIAL ONR EUROPE SUPPORT etc. Bring contacts between young scientists, to be sponsored for example a young scientists for a few weeks working at an important USA institute. Dr. Klose was for a week in Oxford, also at IAU Buenos Aires (financed by the DFG =Deutsche ForschungsGemeinschaft, see this REPORT, Part A; chapter 4.5.3.2)

{end of description of #301}

Chapter 7.3:

Legally Private Institutes  
-----

Among these institutes we also count the ones which are fully financed by a government.

**#401: Physico-Technical Institute Jena**  
Physikalisch-Technisches Institut Jena  
Helmholtz Straße 4  
D/O-6900 Jena  
Telephone: +49 (3641) 23-72 or 23-406  
Telefax: +49 (3641) 23-406  
Telex: 588643

Director (acting): Dr.H.G.Zach

The institute employs 110 scientists, 150 technicians and 30 others. Its departments are:

- Materials Research
- Optics Fibers / Fiber Sensors
- Gas Lasers
- Thermosensors, Optical Coatings
- Thin Film Technology and Components.

**#401\*Q3OCT91\*** Questionnaire completed during and after visit, under its question 3.1., two pages of a new brochure of the institute are copied.

1. GENERAL SURVEY

1.1. Address, Telephone etc.: {see above}

1.3. Organization, Structure, Hierarchy:

Five "Bereiche"(Departments):

- Materials Research
- Optical Fiber
- Fibers, Fiber Research
- Gas Lasers
- Thermosensors, Optical Coatings
- Thin Film Technology and Components

Director: acting Dr. H.G. Zach

1.4. Employees:

230 employees;; scientists 100 among them

1.5. Institute Publications, Host Conferences:

"Wissenschaftliche Berichte des PTI" (Scientific Reports of the PTI), five annual volumes exist (after 1981). No regular hosting of conferences.

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## 2. HISTORY

### 2.1. Long Term History, Founding, Tradition:

01 Jan 1981 all former partial institutes of the Academy of Sciences, in Jena, were combined into one administrative body

## 3. RESEARCH

### 3.1. General areas Covered:

- Physics and technology of production and application of special optical fibers for amplifiers, lasers, switching elements and for energy transfer of lasers with high power;
- Physics and technology of optical components and systems on the basis of monomode optical fibers;
- Physical and technological basic research of multivalent thin film production methods including in situ characterization for the manufacture of high performance functional layers for thin film systems and components in sensor technology, micromechanics, optics, magneto-optical storage, thermoprint heads and electrical resistances of high accuracy;
- Development and application of thin film thermosensors and thermoconverters of high sensitivity with small dimensions on the basis of fundamental research;
- Scientific investigation and further development of methods of crystal growth from a high temperature solution for the production of single crystals as non-linear optical materials and high temperature superconductors;
- Preparation of textures high temperature superconducting film by plasma-activated methods and optimization of their properties especially with respect to the application in SQUIDS;
- Physical and technical investigation of argon ion lasers, CO<sub>2</sub>-lasers and copper-vapor lasers with the aim to increase output power and to adapt the lasers to certain applications using novel methods of excitation;
- Experimental and theoretical investigation on low pressure gas discharges (marginal layers, kinetics of electrons and ions) and applications in the low pressure plasma processing.

### 3.2. Specific Scientific Activities:

The technical/physical research was almost 100% on contracts from industry, financially, occupying about 75% of the employees.

### 3.3. Problems Being Worked on after 01 January 1992: the old ones

### 3.4. Future Scientific Problems Envisioned:

Probably more emphasis on application of supra-conductivity, both the classical one and the "high" temperature one.

## 4. GERMAN UNIFICATION, TRANSITION

### 4.1 Wissenschaftsrat (Science Council):

Has evaluated. positive. Founding commission exists, has met. Chairman: Prof. Bäuerle from Linz, Austria.



4.2. Special Problems of an Administrative Character: Furnishing the existing equipment and other facilities (which slowly are becoming obsolete) by new and modern ones will take some time and will not be easy (financial problems exist).

4.3. International Contacts:

Contacts in all directions existed, but only selected persons could travel to the West. Collaboration with the East was more frequent. Now many scientists go, even for months, to the 11 old länder; contracts exist with companies there. Now contacts with the East are almost restricted to certain areas; in general because of economic reasons (costs of travel!) reduced. Products had been given to the countries in the East, often in exchange for other goods crossing the border.

4.4. Scientific Problems Abandoned after 01 Jan.92

There may be some shifting of emphasis (already the arrival of new leading persons will cause such shifts, of course). Some technicians may become "redundant" because instruments, formerly built here, can now be purchased.

4.5. Released Employees

The situation is very difficult: industry which provided contracts before, cannot do the same now. That will improve in the future, but the transition is difficult and could hardly be called "clear".

There is an interesting problem: because of the lack of opportunities in the former GDR, people in the five new länder are not accustomed to the idea to change, to go abroad, to search for new opportunities, etc.

{Institutions ##402 ff: no worthwhile material received}.

#### Chapter 7.4:

#### Institutions in Special Arrangements

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Some institutes or parts of institutes of the former Academy of Sciences of the GDR could not be directly transformed or incorporated into other transformed institutes, for a variety of reasons. However, in some of the such cases, the scientific objective - albeit maybe too narrow to be made into a fully established institutes -, or the scientific skill of the employees there, warranted to find a temporary solution and to postpone a final decision, supporting a continuation of research work from a special fund of the FRG. At the time of this writing, the following four chemical institutions in Berlin-Adlerhof were counted in this category. Organizationally, they are under the KAI eV (see Part A of this REPORT). The common aim of these four chemical institutions is to maintain strong basic-science foundation but work for application, not necessarily directly for industry but in contact with, above all, small or medium chemical business outfits. The provision of modern research equipment has been much improved in the last two years. Located in Berlin-Adlershof, these four centers are close to a host of other institutions of scientific research and thereby to libraries, computing centers etc. Obviously, these centers have already in the first year attracted research contracts from Western Germany and other European countries. On the same region in Berlin-Adlershof, branch institutions and shops and local representatives of companies from anywhere in the world, especially companies with relations to chemical science and industry, are encouraged, thereby establishing a foothold in a promising environment.

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**#501: Center for Stereo-Selective Organic Synthesis**  
Zentrum für Stereoselektive Organische Chemie (ZSOS)  
Rudower Chaussee 5  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-3161  
Telefax: +49 (30) 6704-2385, -5666  
Scientific Director (acting): Prof.Dr.Schmitz  
Vice Director: Dr. Gründemann  
95 employees  
Departments:  
    Nitrogen-Functionalization (Prof.Dr.Schmitz)  
    Phosphorus-Organics (Prof.Dr.Groß)  
    Analytics (Dr.Gründemann)  
    Medical Drugs (Prof.Dr.Schick)  
    Sulfobetaines (Dr.Ohme)  
    Hetrocyciensynthesis (Prof.Dr.Niclas)

**Research Emphasis:**

- Development of effective methods for the production of compounds not containing anantiomeres (application of chirale auxiliaries and catalysators including enzymes)
- Increase of diastereo selectivity of chemical reactions (inclusion of further elemento-organic compounds which, so far, have not been used and which can be usefully prepared)
- Increase of regio-selectivity and chemo-selectivity of chemical reactions by targeted control of reactivity (reduction of unwanted production of isomeres).

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**#502: Center for Heterogene Catalysis**

Zentrum für Heterogene Katalyse (ZHK)  
Rudower Chaussee 5  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-2285  
Telefax: +49 (30) 6704-2383

Scientific Director: Prof. Dr. Lücke

Vice-Director: Dr. Fricke

Employees: 107, among which are 60 scientists

**Departments:**

Molsleb synthesis and catalysis (Dr. Fricke)  
Analytics and Adsorption (Prof. Dr. Steinike)  
C<sub>1</sub>-Chemistry Hydr. Oxydation (Prof. Dr. Lücke)  
Metal catalysators (Dr. Völter)

**Research emphasis:**

- Basic research for the development of new catalysators and for the understanding of catalytic reactions, including porous and disperse solid state systems
- Synthesis, characterization of molsleben, and the application of them for catalysis and adsorption
- Investigation of new application ranges for heterogenic catalysators in environmental technology, for highly selective and energy-economic reaction, for the development of high-technology materials
- Development of investigation methods for catalytic reactions, especially under in-situ conditions.

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**#503: Center for Anorganic Polymers**

Zentrum für Anorganische Polymere (ZAP)  
Rudower Chaussee 5  
D/O-1199 Berlin-Adlershof

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Telephone: +49 (30) 6704-5686  
Telefax: +49 (30) 6704-4500  
Scientific Director: Prof.Dr.Meisel  
Vice-Director: Prof.Dr.Geßner  
Employees: 310, among them 177 scientists

**Departments:**

Phosphorus-Chemistry (Prof.Dr.Meisel)  
Si/O and Al/O Chemistry (Prof.Dr.Geßner)  
Cement Chemistry (Dr.Herr)  
Fluorometallates (Dr.Bentrup)  
X-Rays (Prof.Dr.Worzala)

**Research emphasis:**

- Basic research on polymere and coordination-polymer anorganic systems, especially of compounds of the 3rd to the 7th major group
- Monomere, aligomere and polymere phosphate compounds: mechanisms of solid state reaction in atomar scale/topochemical aspects
- Chemistry of the  $P^{\text{III}}$ -Oxyde and reactive  $P^{\text{III}}$ -intermediate products; biologically effective P-compounds
- Anorganic monomeres and polymeres on the basis of Si/O and Al/O compounds including construction material and ecologically-relevant heterogenous multielement systems
- Condensation and depolymerization reactions in solution of silicates and aluminates resp. basic Al/salts
- Anorganic aspects of Al-toxidity
- Mechanisms of expansion phenomena ("Treib-Erscheinungen") in cement-based concrete
- Fluorometallites: new magnetic resp. catalytic-active compounds; mechanisms of thermic decomposition reactions.

=====

**#504: Center for Macromolecular Chemistry**  
Zentrum für Makromolekulare Chemie (ZMC)  
Rudower Chaussee 5  
D/O-1199 Berlin-Adlershof  
Telephone: +49 (30) 6704-3266, -3257  
Telefax: +49 (30) 6704-5712  
Telex: 112541-53; 302953-53

Scientific Director: Prof.Dr.Lorkowski  
Vice-Director: Prof.Dr.Carius  
Employees: 69

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**Departments:**

Function polymeres (Prof.Dr.Lorkowski)  
Polyaddition (Prof.Dr.Becker)  
Analytics (Dr.Schulz)  
Adhesion (Dr.Gähde)  
Polymere-Physics (Dr.Carius)

**Research emphasis:**

- Function polymeres for optical information storage and processing
- Polymere Precursor for high-temperature superconductors
- Synthetic bio materials for implants and organ replacement
- Polymere composites and plasma chemistry of polymers
- Dynamics and structure of macromolecular systems
- Multidimensional chromatography of chemically heterogenous polymeres.

**#504\*INOV91\***

**#504\*Q1xyz91\***

1. General Survey

1.1. Address, Telephone, etc.: see above

1.2. Setting, Environment, Access

Berlin-Adlershof is a south-eastern part of the capital Berlin. Accessible by "S-Bahn" and car, near the airport Berlin-Schönefeld

1.3. Organization, Structure, Hierarchy

Bereichsleiter: Prof. Dr. sc.nat. Heinz Raubach.  
Director of the center, associated with TU Berlin,  
3 Departments

1.4. Employees

35 scientists,  
35 technicians  
20% "soft money" workers

1.5. Institute Publication, Host Conferences

Own conferences in the field of polycondensation, radical polymerization, polymer composites, polymers for electro-technic/electronic

2. History of the Institute

2.1. Long-Term History, Founding of the Institute, Tradition

Formed 1957 as Institut für Kunststoffe (IfK) der Deutschen Akademie der Wissenschaften (DAW);  
1967 branch of the "Institut für Organische Hochpolymere" (IOH) der DAW'  
1971 Division "Macromolecular compounds" (Bereich Makromolekulare Verbindungen MV) of the Zentralinstituts für

Organische Chemie (ZIOC) der Akad. der Wiss. der DDR.  
(Central Institute for Organic Chemistry of the Academy of  
Sciences of the GDR).

### 3. Research

#### 3.1. Scientific areas covered:

The Institute for Plastic Materials (Institut für Kunststoffe) of the former German Academy of Sciences was founded in 1957 and became in 1971 as Department of Macromolecular Compounds a part of the Central Institute of Organic Chemistry.

Actually 12 research groups (4-6 scientists each, together with technicians) continue their work in Berlin-Adlershof. These teams are highly experienced in sophisticated synthesis, modifications, characterizations as well as applications of special polymer materials.

The projects listed below were brought to application stage during the eighties. The work was done on behalf and in cooperation with industrial companies.

- heat resistant films and electroinsulating coatings
- polymers for high precision optics
- polymer matrices for magnetic tapes
- toner for electrophotography by micro-suspension polymerization
- solvent free manufacturing process of highly breathable synthetic leather
- polyurethane membranes for waste water treatment and for O<sub>2</sub> sensors
- casting material for dialysis cells
- hip joint socket out of polyurethanes
- plasma modification of film surfaces
- flame retardant, modified phenolic resins
- reactive flame retardants for flexible PUR foam systems

Actually, projects are under investigation either financed out of government sources or on behalf and at the expense of industrial companies.

The application oriented chemical and physico chemical topics are:

- heat resistant polymers and materials with none linear optical properties by polycondensation processes
- synthesis of polyoles and polyurethane elastomers
- development of PUR materials compatible with blood and living tissues

- synthesis of functional and liquid crystalline acrylates and methacrylates and their polymerizations to polymers which are
  - photoreactive and photostructurable
  - photochromic or show a none linear optical behavior (photonic materials)
  - right for water laquers and dispersions
- synthesis of liquid crystalline polyurethanes and composites thereof for coatings
- films and membranes by PUR coagulation processes
- polymer surface modifications by athermic plasma
- study of the mechanisms of polymer pyrolysis
- solvolytic stability of polymers

Continuously updated chromatographic and spectroscopic methods are in use for polymer analysis and characterizations.

The topics of physical research are:

- morphology and mechanical properties of polymer composites and their dependence on physical processes
- investigation of phase separations and breakage mechanisms in polymer networks modified with elastomers
- dielectrical spectroscopic ( $10^5$  to  $10^9$  Hz) investigation of molecular mobility and of physical ageing

The research teams are at investigators disposal for developments of such new polymers as they are needed as special manufacturing materials for sophisticated purposes. Well experienced scientists, being familiar with newest scientific findings, are ready to derive development concepts from the users requirements and to carry out the adequate research.

Furthermore the possibility is given to overtake the technical representation of polymer producers in Berlin.

#### 4. German Unification, Transition

##### 4.1. Science Council (Wissenschaftsrat)

The Wissenschaftsrat investigated the Division of Macromolecular Compounds of the Centralinstitute of Organic Chemistry and recommended transforming the Division into the Center of Macromolecular Chemistry under reducing the number of scientists and technicians from 170 to 70.

- 4.2. The problems here mentioned have been changed soon after the unification. By the help of KAI an appreciable improvement relating to computer systems, foreign journals, travels etc. did proceed.

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#### 4.3. International Contacts

With institutes of the Academy of Sciences of the former USSR and the other East-Block countries (Poland, Hungary, Czechoslovakia, Bulgaria) has been a very close collaboration in the frame work of the so called "Problemkommission of High molecular compounds" which covered scientific problems in the field of polycondensation, polymerization, polymer composites, morphology, biopolymers, stabilization and ageing of polymers.



MAIN CHAPTER 8:

I N D I C E S

=====

contains:

- Chapter 8.1: Carriers of Institutes
- Chapter 8.2: Localities, Länder and Towns
- Chapter 8.3: Alphas.List of Keywords in Institutes' Names
- Chapter 8.4: Acronyms of Institutes' Names
- Chapter 8.5: Sciences Keywords, alphabetical

In all cases, the entries refer to the #numbers of the  
resp.institute.

Chapter 8.1:

CARRIERS OF INSTITUTES  
=====

The main list of institutes in this REPORT, as presented in Main Chapters 4, 5, 6, and 7 of Part B, is given according to institute carriers because that seemed to be the least ambiguous possibility. The following groups are used:

Institute numbers	Carriers
#002-#012	"Großforschungs-Einrichtungen", National Research Laboratories, supported by the federal and länder governments, usually 90/10%, each often maintaining a number of institutes in various länder.
#013-#042	"Institute der Blauen Liste", Institutes of the Blue List, usually 50/50% supported by federal and land government.
#043-#065	"Fraunhofer Einrichtungen oder Aussenstellen", Fraunhofer Establishments or Branch Labs, maintained by the Fraunhofer Society.
#067-#102	"Max-Planck Institute, Arbeitsgruppen, Aussenstellen" Max-Planck Institutes, Working Groups and Branch Institutes, maintained by the Max-Planck Society.
#201-#999	Other carriers, e.g.: #201-#299: Institutes of the Federal Government #301-#399: Institutes of a Land Government #401-#499: Other, Legally Private Institutes* #501-#599: Institutes in special arrangements.

For a more detailed description of the carriers see in this REPORT, Part A, the chapter 4.5.2.\*\*

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\*) the term "Legally Private" is to be taken with caution, because the Fraunhofer and Max-Planck Societies are also legally private, and many of the other institutes as well. The character of #401-#499 may be also described by the fact that these institutes are more dependent in their existence and size on forces of the general market than the others.

\*\*) for the Max-Planck Society also in Part B, Chapter 3.5

## Chapter 8.2:

### Localities, Länder and Towns

=====

The two tables on the next pages lists the #numbers of the institutes\* according to towns and to länder. This allows to get a feeling for the concentration of research, and if a trip brings one into a town it may be easy to find which other institutes there may be of interest. A similar list for West-Germany (the old eleven länder) would show a more even distribution.

In the first table (on the next page), after each town name the telephone town code is given in brackets [], and the land in which that town is situated, with two letters:

BE : Berlin (but only East-Berlin)  
BG : Brandenburg  
MV : Mecklenburg-Vorpommern (Mecklenburg-Western Pomerania)  
SN : Sachsen (Saxonia)  
ST : Sachsen-Anhalt (Saxonia-Anhalt)  
TH : Thüringen (Thuringia)

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\*) The four-digit #numbers (given after -- ) refer to the universities which are not described in this Part B of the REPORT. They will be mentioned in Part C.

\*\*) The town "Karl-Marx-Stadt" now has again its traditional name: "Chemnitz".

TABLE I: Non-University Research Institutes (three digits after#) and Universities (four digits after#) in East-Berlin and Towns in the Five New Länder of Germany (not all these universities will survive the present re-organization). There are also some individual research institutes of universities in some towns not listed here.

-----  
Adlershof - see Berlin-Adlershof  
Babelsberg - see Potsdam-Babelsberg  
Bergholtz-Rehbrücke [33200] BG: #056,  
Berlin (East-)[30] BE, including Berlin-Adlershof and Berlin-Buch:  
    #002, #004, #005, #009, #010, #013, #016, #020, #022, #025,  
    #028, #034, #035, #041, #042, #049, #055, #060, #063, #065,  
    #070, #071, #081, #085, #088, #090, #091, #092, #101, #102,  
    #501, #502, #503, #504 -- #1100,  
Buch - see Berlin-Buch  
Chemnitz [371] SN: #404, -- #4400,  
Cottbus [355] BG: -- #2300  
Dresden [351] SN, including Rossendorf: #014, #015, #021, #045,  
    #047, #048, #050, #051, #054, #061, #062, #064, #083, #089,  
    #403, -- #4300, #4600, #4700,  
Erfurt [361] TH: #087, -- #6300,  
Frankfurt (Oder) [335] BG: #029, -- #2200,  
Freiberg [3731] SN: -- #4500,  
Gatersleben [39482] ST: #026,  
Greifswald [3834] MV: #023, -- #3100,  
Halle [345] ST: #027, #058, #067, #076, #098, -- #5100,  
Ilmenau [36577] TH: -- #6200,  
Jena [3641] TH: #039, #043, #072, #075, #078, #079, #080, #086,  
    #094, #401, -- #6100,  
Köthen [3496] ST: -- #5400,  
Kühlungsborn [38293] MV: #032,  
Leipzig [341] SN: #003, #024, #037, #095, #402, -- #4100, #4200,  
Lindenberg [3???] BG: #202  
Magdeburg [391] ST: #012, #038, #046, -- #5200, #5500,  
Merseburg [3461] ST: -- #5300,  
Potsdam [331] BG, including Potsdam-Babelsberg: #006, #007, #019,  
    #036, #093, #201, -- #2100,  
Rossendorf - see Dresden  
Rostock [381] MV, including Warnemünde: #031, #057, #074, #096,  
    #097, -- #3200,  
Tautenburg near Dornburg [36427] TH: #301,  
Teltow [3328] BG, including Teltow-Seehof: #011, #044, #059, #068,  
Waldheim [34327] SN: #405,  
Warnemünde - see Rostock  
Weimar [3643] TH: -- #6400,  
Wismar [3841] MV: -- 3300,  
Zeuthen [33762] BG: #008,  
Zittau [3583] SN: -- #4800,  
Zwickau [357] SN: -- #4900,  
Not yet determined: #052

TABLE II: Essentially the same material as on previous page, but grouped to the länder:

-----

BERLIN (EAST) (BE):

Berlin (East-): #002, #004, #005, #009, #010, #013, #016, #020, #022, #025, #028, #034, #035, #041, #042, #049, #055, #060, #063, #065, #070, #071, #081, #085, #088, #090, #091, #092, #101, #102, #501, #502, #503, #504 -- #1100,

BRANDENBURG (BG):

Bergholtz-Rehbrücke: #056,  
Cottbus: -- #2300  
Frankfurt (Oder): #029, -- #2200,  
Lindenberg: #202  
Potsdam: #006, #007, #019, #036, #093, #201, -- #2100,  
Teltow: #011, #044, #059, #068,  
Zeuthen: #008,

MECKLENBURG-VORPOMMERN (MV) - [Mecklenburg/Western-Pomerania]

Greifswald: #023, -- #3100,  
Kühlungsborn: #032,  
Rostock: #031, #057, #074, #096, #097, -- #3200,  
Wismar: -- 3300,

SACHSEN (SN): - [Saxonia]

Chemnitz [371] SN: #404, -- #4400, formerly Karl-Marx Stadt.  
Dresden: #014, #015, #021, #045, #047, #048, #050, #051, #054, #061, #062, #064, #083, #089, #403 -- #4300, #4600, #4700  
Freiberg: -- #4500,  
Leipzig: #003, #024, #037, #095, #402, -- #4100, #4200,  
Waldheim: #405,  
Zittau: -- #4800,  
Zwickau: -- #4900,

SACHSEN-ANHALT (ST): - [Saxonia-Anhalt]

Gatersleben: #026,  
Halle: #027, #058, #067, #076, #098, -- #5100,  
Köthen: -- #5400,  
Magdeburg: #012, #038, #046, -- #5200, #5500,  
Merseburg: -- #5300,

THÜRINGEN (TH): - [Thuringia]

Ilmenau: -- #6200,  
Jena: #039, #043, #072, #075, #078, #079, #080, #086, #094, #401, -- #6100,  
Erfurt: #087, -- #6300,  
Tautenburg near Dornburg: #301,  
Weimar: -- #6400,

Not yet determined: #052

Chapter 8.3:

Institutes, etc., Alphabetical  
-----

The essential words in both the original German names of non-university research institutes as well as in the English translations, are listed in alphabetical order; at the end of each line the #number is pointing to the specific institute as described in main chapters 4, 5, 6, and 7, above. Words such as "Institute for.." or "Center for.." are omitted. "under" refers to partial institute with own name or to former name.

Acoustical Diagnostics and Quality Control, #064  
Aerospace Research Center, #004  
Air Chemistry, #065  
Akustische Diagnostik und Qualitätssicherung, #064  
Algebraic Geometry and Number Theory, #091  
Algebraische Geometrie und Zahlentheorie, #091  
Analyse, angewandte, (in Verbindung zu Stochastik), #020  
Analyse, komplexe, und partielle Differentialgleichungen, #092  
Analyse von Stoffen mittels spektroskopischer Methoden, #041  
Analysis, applied, (in relation to stochastics), #020  
Analysis, complex, and partial differential equations, #092  
Angewandte Analyse, #020  
Angewandte Optik und Feinmechanik, #043  
Angewandte Polymerforschung, #044  
Anorganic Polymers, #503  
Anorganische Polymere, #503  
Applied Analysis (in relation to stochastics), #020  
Applied Optics and Precision Mechanics, #043  
Applied Polymer Research, #044  
Astronomical Observatory Karl=Schwarzschild, #301  
Astronomisches Observatorium Karl=Schwarzschild, #301  
Astrophysics, #019  
Astrophysics, non-linear dynamics in, #093  
Astrophysik, #019  
Astrophysik, nicht-lineare Dynamik in der, #093  
Asymmetric Catalysis, #097  
Asymmetrische Katalyse, #097  
Atmosphäre, Physik, #032  
Atmosphärische Chemie, #065  
Atmospheric Chemistry, #065  
Atmospheric Physics, #032  
Automation and performance of factories, #046  
Automation of the Circuit and Systems Projection, #054  
Automatisierung des Schaltkreis- und Systems-Entwurfs, #054  
Automatisierung und Betrieb von Fabriken, #046  
  
Bacillus subtilis, DNA-Replikation bei -, Regulation der , #075  
Bacillus subtilis, DNA-Replication with-, regulation of, #075  
Baltic Sea Research, #031

Beam, Electron, and Plasma, #045  
Berlin, Forschungsverbund, #042  
Berlin, Research Association, #042  
Betrieb und Automatisierung von Fabriken, #046  
Bildverarbeitung, #055  
Biochemical Ecolo-Toxicology, #056  
Biochemie der Pflanzen, #027  
Biochemische Ökotoxikologie, #056  
Biochemistry of plants, #027  
Biologie, Neuro-, #038  
Biology, Neuro-, #038  
Biotechnology, under #003  
Biotechnologie, molekulare, #039  
Biotechnology, molecular, #039  
Bodies, heterogenous solid, mechanics of, #083  
Braun, Ferdinand, Institut, #034  
  
Calculation, failure-tolerant, #090  
Carbondioxide Chemistry, #072  
Catalysis, asymmetric, #097  
Catalysis, complex, #096  
Catalysis, heterogenic, #502  
Cell Division Regulation and Gene Substitution, #085  
Cellular and molecular physiology, #080  
Ceramic Technology and Sinter Materials, #047  
Chemie, Bio-, der Pflanzen, #027  
Chemie der Atmosphäre, #065  
Chemie des Kohlendioxids, #072  
Chemie des CO<sub>2</sub>, #072  
Chemie, makromolekulare, #504  
Chemie, Polymeren-, #011  
Chemie, Quanten-, #070  
Chemistry, atmospheric, #065  
Chemistry, Bio-, of Plants, #027  
Chemistry, macromolecular, #504  
Chemistry of CO<sub>2</sub>, #072  
Chemistry, polymer-, #011  
Chemistry, Quantum-, #070  
Circuit and Systems Projection, automation of, #054  
Circuits, microelectronic, and systems, #048  
Climatological Problems and Consequences, #036  
CO<sub>2</sub> Chemie, #072  
CO<sub>2</sub> Chemistry, #072  
Colloid and Interface Research, #068  
Communication technology, high-frequency, #034  
Complex Analysis and partial differential equations, #092  
Complex and correlated electron systems, #089  
Complex Catalysis, #096  
Compound materials and powder metallurgy, #062  
Compounds of polymers, #059  
Computer, innovative systems, #005

Computer Systems, innovative, #005  
Consequences of climates, #036  
Continental polar research, #007  
Control Systems for Processes, #061  
Correlated and complex electron systems, #089  
Crystal Cultivation, #028  
Crystal, liquid, synthesis, structure, properties of systems of, #098  
Cultivation of crystals, #028

Data Processing, Graphic, #057  
Datenverarbeitung, graphische, #057  
Dependable Integrated Micro Systems, #052  
DESY-Zeuthen, #008  
Diagnostics, acoustical, and quality control, #064  
Diagnostik, akustische, und Qualitätssicherung, #064  
Differential Equations, partial, and complex analysis, #092  
Differentialgleichungen, partielle, und komplexe Analyse, #092  
Diffraction of X-Rays in Laminar Systems, #088  
Dimensions-Reduzierte Halbleiter, #071  
Division of cells and substitution of genes, #085  
DNA-Replication with Bacillus subtilis, regulation of, #075  
DNA-Replikation bei Bacillus subtilis, Regulation der, #075  
Drude, Paul, Institut, #013  
Dust in Star-Forming Regions, #078  
Dynamics, non-linear, in Astrophysics, #093  
Dynamik, nicht-lineare, in der Astrophysik, #093

Ecelogo-Toxicology, Biochemical, #056  
Electroluminescence, #025  
Electron Beam and Plasma Techniques, #045  
Electron Synchrotron, #008  
Electron systems, complex and correlated, #089  
Electronics of Solids, #013  
Elektro-Lumineszenz, #025  
Elektronenstrahl- und Plasmatechnik., #045  
Elektronensysteme, komplexe und korrelierte, #089  
Elektronik der Festkörper, #013  
Energie, Hoch-, Physik, #008  
Entstehungsgebiete der Sterne, Staub in, #078  
Entwurf von Schaltkreisen und Systemen, Automatisierter, #054  
Environmental Research Center, #003  
Enzymologie der Peptidbindung, #076  
Enzymology of the Peptide Bond, #076  
Equations, partial differential, and complex analysis, #092  
Extraterrestrial Physics, #101  
Extraterrestrische Physik, #101

Fabrikbetrieb und Automatisierung, #046  
Factory Performance and Automation, #046  
Failure Tolerant Calculation, #090  
Fehlertolerantes Rechnen, #090



Feinmechanik und angewandte Optik, #043  
Ferdinand-Braun Institut, #034  
Festkörper, heterogene, ihre Mechanik, #083  
Festkörperelektronik, #013  
Festkörperforschung, #014  
Festkörperphysik, #014  
Forming of metals, and heavy machinery, #050  
Forschungsverbund Berlin, #042  
Forschungszentrum Rossendorf, #021  
Fotovoltaik, #010  
Fusion-Oriented Plasma Physics, #009  
Fusions-orientierte Plasmaphysik, #009

Gene Substitution and Cell Division Regulation, #085  
Genetics of plants, #026  
Genetik der Pflanzen, #026  
Gensubstitution und Zellteilungsregulation, #085  
Geo-Ecology, under #003  
Geo-Forschungszentrum, #006  
Geo-Research Center, #006  
Geometrie, algebraische, und Zahlentheorie, #091  
Geometry, algebraic, and number theory, #091  
Gewässer Forschung, #012  
Graphic Data Processing, #057  
Graphische Datenverarbeitung, #057  
Gravitational Theory, #079  
Gravitationstheorie, #079  
Grenzflächen- und Kolloidforschung, #068  
Growth Factors, Modulation of the Signal Transduction in, #086

Halbleiter, dimensions-reduzierte, #071  
Halbleiter, III-V, #013, #035  
Halbleiterphysik, #209  
Hämostaseologie, Pharmakologische, #087  
Hemostaseology, Pharmacological, #087  
Heterogenic Catalysis, #502  
Heterogene Festkörper, ihre Mechanik, #083  
Heterogene Katalyse, #502  
Heterogenous solid bodies, mechanics of, #083  
High-Energy Physics, #008  
High-Frequency Communication Technology, #034  
Hochenergiephysik, #008  
Hochfrequenzkommunikationstechnik, #034

Image Processing, #055  
Innovative Computer Systems, #005  
Innovative Rechnersysteme, #005  
Integrated Micro Systems Dependable, #052  
Interface and Colloid Research, #068  
Integrierte Mikrosysteme, zuverlässige, #052  
Isotope Institute, under #003

Jena Physico-Technical Institute, #401  
Karl-Schwarzschild Observatorium/Observatory, #301  
Katalyse, asymmetrische, #097  
Katalyse, heterogene, #502  
Katalyse, komplexe, #096  
Klimafolgenforschung, #036  
Kohlendioxid-Chemie, #072  
Kolloid- und Grenzflächenforschung, #068  
Kommunikationstechnik, Hochfrequenz-, #034  
Komplexe Analyse und partielle Differentialgleichungen, #092  
Komplexe Katalyse, #096  
Komplexe und korrelierte Elektronensysteme, #089  
Kontinentale Polarforschung, #007  
Korrelierte und komplexe Elektronensysteme, #089  
Kristallzüchtung, #028  
Kurzzeitspektroskopie, #022

Lakes research, #012  
Laminal Systems, X-Ray Diffraction in, #088  
Lamination technology and material physics, #051  
Liquid crystal systems, synthesis, structure, and properties, #098  
Low Temperature Plasma Physics, #023  
Luft- und Raumfahrt Forschungszentrum, #004  
Luftchemie, #065  
Luminescence, electro-, #025  
Lumineszenz, Elektro-, #025

Machinery, heavy, and metal forming, #050  
Macromolecular Chemistry, #504  
Makromolekulare Chemie, #504  
Material analysis by spectroscopical methods, #041  
Material Physics and Lamination Technology, #051  
Materials and systems, microstructure of, #058  
Materials, compound, and powder metallurgy, #062  
Materials research, #014  
Mechanics of Heterogenous Solid Bodies, #083  
Mechanics, precision- and applied optics, #043  
Mechanik heterogener Festkörper, #083  
Membran-Forschung, #011  
Membrane research, #011  
Metal Forming and Heavy Machinery, #050  
Metallurgy of powder and compound materials, #062  
Meteorological Observatories, #201, #202  
Meteorologische Observatoria, #201, #202  
Micro Systems, dependable integrated, #052  
Microelectronic circuits and systems, #048  
Microstructural Physics, #067  
Microstructure of Materials and Systems, #058  
Mikroelektronische Schaltungen und Systeme, #048  
Mikrostruktur von Werkstoffen und Systemen, #058  
Mikrostrukturphysik, #067

Mikrosysteme, zuverlässige integrierte, #052  
Modification of surfaces, #024  
Modifizierung von Oberflächen, #024  
Modulation der Signalübertragung von Wachstumsfaktoren, #086  
Modulation of the Signal Transduction in Growth Factors, #086  
Molecular and cellular Physiology, #080  
Molecular Biotechnology, #039  
Molecular medicine, #002  
Molecular Pharmacology, #016  
Molekulare Biotechnologie, #039  
Molekulare Medizin, #002  
Molekulare Pharmakologie, #016  
Molekulare und zelluläre Physiologie, #080  
Multi-Particle Systems, theoretical, #074

Neurobiologie, #038  
Neurobiology, #038  
Nicht-lineare Dynamik in der Astrophysik, #093  
Nichtklassische Strahlung, #081  
Nichtlineare Optik, #022  
Niederdruckplasmaphysik, #023  
Non-classical Radiation, #081  
Non-linear Dynamics in Astrophysics, #093  
Non-linear Optics, #022  
Number Theory and algebraic geometry, #091

Oberflächenmodifizierung, #02  
Observatoria, Meteorologische, #201, #202  
Observatories, Meteorological, #201, #202  
Observatorium, astronomisches Karl=Schwarzschild, #301  
Observatory, astronomical, Karl=Schwarzschild, #301  
Oceanography Baltic Sea, #031  
Ökotoxikologie, biochemische, #056  
Optics, applied, and Precision Mechanics, #043  
Optics, non-linear, #022  
Optics of X-Rays, #094  
Optik, angewandte, und Feinmechanik, #043  
Optik der Röntgenstrahlen, #094  
Optik, nichtlineare, #022  
Optimization of processes, #060  
Opto-Elektronik, #034  
Optoelectronics, #034  
Organic Synthesis, Stereo-Selective, #501  
Ostseeforschung, #031  
Ozeanographie der Ostsee, #031

Partial Differential Equations and Complex Analysis, #092  
Partielle Differentialgleichungen und komplexe Analyse, #092  
Paul-Drude Institut, #013  
Peptidbindung, Enzymologie der, #076  
Peptide Bond, Enzymology of, #076

Performance and automation of factories, #046  
Pflanzenbiochemie, #027  
Pflanzen-genetik, #026  
Pharmacological Hemostaseology, #087  
Pharmacology, molecular, #016  
Pharmakologie, molekulare, #016  
Pharmakologische Hämostaseologie, #087  
Photo-Voltaics, #010  
Photovoltaik, #010  
Physico-Technical Institute Jena, #401  
Physics, Astro-, non-linear dynamics in, #093  
Physics, Astro-, #019  
Physics, atmospheric, #032 (see also ,meteorology)  
Physics, extraterrestrial, #101  
Physics, high-energy, #008  
Physics, microstructural, #067  
Physics of solid state, #014  
Physics of materials and lamination technology, #051  
Physics of semiconductors, #029  
Physics, Plasma, #102  
Physics, Plasma-, low temperature, #023  
Physics, Plasma-, fusion oriented, #009  
Physik, Astro-, #019  
Physik der Atmosphäre, #032 (see also Meteorologie)  
Physik der Festkörper, #014  
Physik der Halbleiter, #029  
Physik der Plasmen, #102  
Physik der Werkstoffe, #051  
Physik des Niederdruckplasmas, #023  
Physik, extraterrestrische, #101  
Physik, Hochenergie-, #008  
Physik, Mikrostruktur-, #067  
Physik, Plasma-, fusions-orientierte, #009  
Physikalisch-Technisches Institut Jena, #401  
Physiologie, molekulare und zelluläre, #080  
Physiology, molecular and cellular, #080  
Planetology, under #004  
Plant Biochemistry, #027  
Plant Genetics, #026  
Plasma and Electron Beam Techniques, #045  
Plasma, low temperature, #023  
Plasma, Niederdruck-, #023  
Plasma Physics, fusion-oriented, #009  
Plasma Physics, #102  
Plasma- und Elektronenstrahltechnik, #045  
Plasmaphysik, #102  
Plasmaphysik, fusions-orientierte, #009  
Polar research, continental, #007  
Polarforschung, kontinentale, #007  
Polymer, applied research, #044  
Polymer Compounds, #059

Polymer Research, #015  
Polymer-chemistry, #011  
Polymer-Verbunde, #059  
Polymere, anorganische, #503  
Polymerenchemie, #011  
Polymerforschung, #015  
Polymerforschung, angewandte, #044  
Polymers, anorganic, #503  
Powder Metallurgy and Compound Materials, #062  
Precision Mechanics and Applied Optics, #043  
Problems of climates, #036  
Process Control Systems, #061  
Process Optimization, #060  
Processing, graphical, of Data, #057  
Processing of images, #055  
Projection of Circuits and Systems, automation of, #054  
Prozeß-Optimierung, #060  
Prozeß-Steuerung, #061

Qualitätssicherung und akustische Diagnostik, #064  
Quality control and acoustical diagnostics, #064  
Quantenchemie, #070  
Quantum Chemistry, #070

Radiation, non-classical, #081  
Raum- und Luftfahrt Forschungszentrum, #004  
Rechnen, das fehlertolerant ist, #090  
Rechnersysteme, innovative, #005  
Reduced-Dimensions Semiconductors, #071  
Regulation der Zellteilung und Substitution der Gene, #085  
Regulation des DNA-Replikation bei Bacillus subtilis, #075  
Regulation of DNA-Replication with Bacillus subtilis, #075  
Replication of DNA with Bacillus subtilis, regulation of, #075  
Research Association Berlin, #042  
Research Center Rossendorf, #021  
Rivers research, #012  
Robotersystemtechnik, #063  
Robotic Systems Technology, #063  
Röntgenbeugung an Schichtsystemen, #088  
Röntgenoptik, #094  
Rossendorf Forschungszentrum, #021  
Rossendorf Research Center, #021

Schaltkreis- und System-Entwurf, Automatisierung, #054  
Schaltungen und Systeme, mikroelektronische, #048  
Schicht-Technologie und Werkstoff-Physik, #0651  
Schichtsysteme, Röntgenbeugung an, #088  
Schwarzschild Observatory/Observatorium, #301  
Semiconductor Physics, #029  
Semiconductors, III-V, #013, #035  
Semiconductors with reduced dimensions, #071

Sensors, Space-, #004  
Signal Transduction in Growth Factors, Modulation of, #086  
Signalübertragung von Wachstumsfaktoren, Modulation der, #086  
Sinter materials and ceramic technology, #047  
Software and Systems Techniques, #049  
Software und Systemstechnik, #049  
Solid bodies, heterogenous, mechanics of, #083  
Solid state electronics, #014  
Solid State Physics, #014  
Solids, electronics of, #013  
Space Sensors, under #004  
Spectroscopical methods of material analysis, #041  
Spectroscopy, time-resolved, #095  
Spectroscopy, time-resolved, #022  
Spektroskopie, Kurzzeit-, #022  
Spektroskopie, zeitaufgelöste, #095  
Spektroskopische Methoden der Stoffanalyse, #041  
Star-Forming Regions, Dust in, #078  
Staub in Sternentstehungsgebieten, #078  
Stereo-Selective Organic Synthesis, #501  
Stern-Entstehungsgebieten, Staub in, #078  
Stochastics, #020  
Stochastik, #020  
Stoffanalyse mit spektroskopischen Methoden, #041  
Strahlung, nichtklassische, #081  
Substitution der Gene und Regulation der Zellteilung, #085  
Substitution of genes and cell division regulation, #085  
Surface Modification, #024  
Synthesis, organic, stereo-selective, #501  
Synthesis, structure and properties of liquid crystal systems, #098  
Systemtechnik, Roboter-, #063

Technologie der Schichten, #051  
Technology of lamination, #051  
Technology of Robotic Systems, #063  
Theoretical Multi-Particle Systems, #074  
Theoretische Vielteilchensysteme, #074  
Time-resolved spectroscopy, #095  
Time-resolved spectroscopy and non-linear optics, #022  
Tolerance for failures in calculation, #090  
Toleranz für Fehler im Rechnen, #090  
Toxicology, Ecolo-, Biochemical, #056  
Toxikologie, ökologische, biochemische, #056  
Troposphärenforschung, #037  
Tropospheric Research, #037

Umformtechnik und Werkzeugmaschinen, #050  
Umwelt-Forschungs Zentrum, #003  
Underground water research, #012

Verbunde von Polymeren, #059  
Vielteilchensysteme, theoretische, #074  
Voltaics, photo-, #010

Wachstumsfaktoren, Modulation der Signalübertragung in, #086  
Water, underground, research, #012  
Weltraum-Sensorik, under #004  
Werkstoff-Physik und Schicht-Technologie, #051  
Werkstoffe und Systeme, Mikrostruktur, #058  
Werkstoffforschung, #014  
Werkzeugmaschinen und Umformtechnik, #050  
Wirkstoffforschung, under #016

X-Ray Diffraction of Laminar Systems, #088  
X-Ray Optics, #094

Zahlentheorie und algebraische Geometrie, #091  
Zeitaufgelöste Spektroskopie, #095  
Zeitaufgelöste Spektroskopie und nichtlineare Optik, #022  
Zellteilungsregulation und Gensubstitution, #085  
Zelluläre und molekulare Physiologie, #080  
Züchtung von Kristallen, #028  
Zuverlässige Integrierte Mikrosysteme, #052

III-V Halbleiter, #013, #035  
III-V Semiconductors, #-013, #035

{end of alphabetical institutes list}

#### Chapter 8.4:

##### Acronyms - English and German

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Whenever possible, the acronyms are spelled out and, if necessary, explained. Such an explanation may be a translation of a German acronym into English, and/or a reference to a chapter etc. in this REPORT where it is described. In general, this reference is to the particular chapter, preceded by an A for Part A, and B for Part B. In references to chapters A7, B4, B5, B6, and B7, the (#) number of the institution is given for which that acronym stands.

The collection of acronyms of non-university institutes included in the following list is not complete; in many cases, an institute acquires an "official" acronym only at some later time after its foundation. Acronyms of university institutes which may be mentioned or described only in Part C of this REPORT, are not included here.

The word "see" with a (#) number symbol refers to a mentioning or remark in the text of the description of the institute with that (#) number.

Included are the acronyms of the former institutes of the GDR Academy of Sciences in Berlin-Adlershof; instead of a (#) number, the note (GDR) is added. The former Academy institutes outside Berlin-Adlershof (i.e., in other parts of Berlin or other towns of the GDR) are not included.



AAAS = American Association for the Advancement of Science, A5.2.2  
AAS = Inst.f.Angewandte Analysis and Stochastik, #020  
ACG = American Council on Germany, A5.2.7  
AdW = Akademie der Wissenschaften = Academy of Sciences  
AG = Aktiengesellschaft = Joint Stock Company  
AG = Arbeitsgruppe = Working Group  
AGF = Arbeitsgemeinschaft Großforschungs Einrichtungen, A4.5.2.3  
AICGS = Amer.Inst.f.Contemporary German Studies, A5.2.8  
AiF = see A4.5.2.5  
AvH = Alexander-von-Humboldt Stiftung (=Foundation), A5.6  
AWI = Alfred-Wegener Institut, see #007  
BE = Berlin, A4.4.2  
BG = Brandenburg, A4.4.3  
BL = Blaue Liste = Blue List, see A4.5.2.4  
BLK = "Bundes-Länder Kommission", see A4.3.3  
BMFT = Bundesministerium der Forschung und Technologie = FMRT  
BMVg = Bundesministerium der Verteidigung = MoD or FMoD  
BMW B = Bundesministerium für Wissenschaft und Bildung, A4.2.4  
BRD = Bundesrepublik Deutschland = Federal Republic of Germany CCD = Charge-Coupled Device (Camera)  
CDSA = analyser for cosmic dust by satellites, see #004  
CIES = Council f.Internat.Exchange of Scholars, see under A5.3  
CMM = Centrum für Molekulare Medizin, #002  
CSFR = Czechoslovakia  
DAAD = Deutscher Akademischer Austauschdienst, A5.5  
DARA = Deutsche Agentur f.Raumfahrt Angelegenheiten  
DARA = German Space Agency  
DDR = Deutsche Demokratische Republik = German Democrat.Republic  
DESY = see #008  
DFG = Deutsche Forschungs Gemeinschaft, A4.5.3.2  
DFVLR = old acronym now replaced by DLR (see there)  
DLE = Dienstleistungseinrichtung Berlin-Adlershof\* (GDR)  
DLR = Deutsche Forschungsanstalt für Luft- und Raumfahrt, A5.8.8  
DLR = German Aerospace Research Establishment  
DM = Deutsche Mark, German mark (currency)  
DWD = Deutscher Wetterdienst = German Weather Service  
e.V. or eV = eingetragener Verein = licensed association  
EADQ = Fh-Aussenstelle f.akust.Diagnostik etc., #064  
EAS = Fh-Aussenstelle f.Automatisierung etc., #054  
EBV = Fh-Aussenstelle f.Bildverarbeitung, #054  
ELC = Fh-Aussenstelle f.Luftchemie, #065

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\*) DLE = joint establishment to support the institutes in Berlin-Adlershof with eight departments (building of equipment etc./etc.)

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EOARD = see A5.2.14  
EPO = Fh-Aussenstelle f.Prozeß=Optimierung, #056  
EPS = Fh-Aussenstelle f.Prozeß-Steuerung, #057  
EPV = Fh-Aussenstelle f.Polymer-Verbunde, #055  
ERS = Fh-Aussenstelle f.Roboter-Systemtechnik, #063  
ESA = European Space Administration  
FBH = Ferdinand-Braun Institut etc., #034  
FH = Fachhochschule = College at a level lower than university  
FhE = Fraunhofer Einrichtung = Fraunhofer Establishment  
FhG = Fraunhofer Gesellschaft = Fraunhofer Society, A4.5.2.2  
FhG = Fraunhofer Gesellschaft (-Society)  
FhI = Fraunhofer Institute  
FIPP = Forschungsstelle f.inform.Photochemie & Photophysik (GDR)  
FIRST = see B4.1, #005  
FMOD = Federal Ministry of Defense, A4.2.5  
FMRT = Federal Ministry for Research and Technology, A4.2.3  
FRG = Federal Republic of Germany  
FSU = Friedrich-Schiller Universität Jena  
FUB = Freie Universität Berlin (West-)  
FuE = Forschung und Entwicklung = Research and Development  
FZR = Forschungs Zentrum Rossendorf, #021  
GDR = German Democratic Republic  
GE = Germany  
GKSS = Forschungszentrum Geesthacht, see #011 and #012  
GmbH = Gesellschaft mit beschränkter Haftung, about "Ltd."  
GMD = Gesellschaft für Mathematik & Datenverarbeitung, see #005.  
HHI = Heinrich Hertz Institut (GDR)  
HMI = Hahn-Meitner Institut, see #010  
HRK = "Hochschul-Rektoren Konferenz", see A4.3.2  
HUB = Humboldt-Universität Berlin (East-), the old University  
ICT = Institut für Chemische Technologie (GDR)  
IFE = Institut f.Festkörperphysik etc., see under #067  
IFW = Institut f.Festkörperphysik u.Werkstoffforschung, #014  
IFW = Institut für Werkstoffforschung, now #016  
IGG = Institut für Geographie und Geo-Ökologie (GDR)  
IHP = Institut für Halbleiterphysik, #029  
IIR = Institut für Informatik und Rechentechnik (GDR)  
IKF = Institut für Kosmosforschung (GDR), nw see #004  
IKTS = Fh-Einrichtung f.Keramische Technologien etc, #047  
IMECH = Institut für Mechanik (GDR)  
IMSD 2 = Fh-Inst.f.Mikroelektron.Schaltungen, #048  
INOK = Inst.f.Nichtlineare Optik & Kurzzeitspektroskop., #022  
IPF = Institut für Polymerforschung, #015  
IPP = Max-Planck Institut für Plasma Physik, see #009  
ISST = Fh-Einrichtung f.Software & Systemtechnik, #049  
IUW = Fh-Einrichtung f.Umformtechnik u.Werkzeugmaschinen #050  
IWS = Fh-Einrichtung f.Werkstoff-Physik etc., #051  
JHU = Johns Hopkins University

JPL = Jet Propulsion Laboratory, Pasadena, CA  
KAI = see A4.2.2.  
KFA = Kernforschungszentrum Jülich = Nuclear  
Res.Etabl.Jülich  
KFK = Kernforschungszentrum Karlsruhe = Nuclear Res.Center K.  
KMK = "Kultusminister-Konferenz", see A4.3.1  
KMU = Klein- und Mittelständische Unternehmungen = Small  
Business  
LMAD = Laboratorium für Maschinen- und Anlagen-Dynamik (GDR)  
LSMS = Laboratorium f.Spektroskop.Methoden Stoffanal., etc,  
#041  
MIR = Russian space station, see #004  
MLU = Martin-Luther Universität Halle-Wittenberg  
MoD = Ministry of Defense, A4.2.5  
MOS = an optical scanner for satellites, see #004  
MPAG = Max-Planck Arbeitsgruppe (-Working Group)  
MPG = Max-Planck Gesellschaft = Max-Planck Society, A4.5.2.1  
MPI = Max-Planck Institute  
MV = Mecklenburg-Vorpommern=Mecklenburg-Western  
Pomerania,A4.4.4  
NIR = near infrared  
MNRL = Naval Research Laboratory, Washington DC  
NSF = National Science Foundation, A5.2.3  
OCNR = Office of the Chief of Naval Research  
ONR = Office of Naval Research  
ONR EUROPE = Office of Naval Research European Office (London)  
PDI = Paul-Drude Institut für Festkörperphysik, #013  
PIK = Potsdam Institut für Klimafolgenforschung, #036  
R&D = Research and Development  
S-Bahn = Suburban Railroad in and around large cities  
SN = Sachsen = Saxonia, A4.4.5  
ST = Sachsen-Anhalt = Saxonia-Anhalt, A4.4.6  
STN = see A4.7.4, and A4.7.5  
TH = Technische Hochschule = Technical University  
TH = Thüringen = Thuringia, A4.4.7  
TIB = Technische Informations Bibliothek, A4.7.6  
TU = Technische Universität  
TUB = Technische Universität Berlin (West-)  
U.N. = United Nations  
U-Bahn = Underground, Subway (amer.), Metro, "Tube"  
UFZ = Umwelt Forschungs Zentrum, #003  
USAF = United States Air Force  
USARDSG = see A5.2.14  
USIA = United States Information Agency  
VIS = visible range of the eletromagn.spectrum  
WAOSS = a camera for satellite, see #004  
WIP = Wissenschaftler Integrations Program, see under #075  
ZAP = Zentrum für Anorganische Polymere, #503  
ZHK = Zentrum für Heterogene Katalyse, #502  
ZIE = Zentralinstitut für Elektronenphysik (GDR)  
ZIAC = Zentralinstitut für Anorganische Chemie (GDR)

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ZIOC = Zentralinstitut für Organische Chemie (GDR), see #096  
ZIPC = Zentralinstitut für Physikalische Chemie (GDR)  
ZIPE = Zentralinstitut für die Physik der Erde (GDR)  
ZKI = Zentralinstitut für Kybernetik und Inform.Prozesse  
(GDR)  
ZMC = Zentrum für Makromolekulare Chemie, #504  
ZOS = Zentralinstitut für Optik und Spektroskopie (GDR)  
ZWG = Zentrum für wissenschaftlichen Gerätebau (GDR)  
ZSOS = Zentrum für Stereo-Selekt.Org.Chemie, #501

## Chapter 8.5:

### Science Keywords, Alphabetical

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These keywords were extracted from the institute descriptions of Main Chapters 4 through 7 in this REPORT, Part B. Because it was not possible to check the translations of the German concepts and words into English by experts in the very many detailed disciplines, it must be expected that some translated expressions will not be intelligible.

Chapter 8.3., above, presents the keywords extracted from institute names, serving as a kind of alphabetical list of institutions.

Acronyms are presented in chapter 8.4., above, with some explanation. However, if an acronym is in fact a scientific technical term, and an explanation is either not needed or difficult to be given in a short form, the acronym is treated as a science keyword and included in this chapter 8.5, below.

The following alphabetical list begins with some "keywords" which are numbers or are preceded by numbers; thereafter the main list begins with letter A.

#### NUMBERS

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1 Mev JEOL electron microscope, #067  
1.5  $\mu$ m CMOS/BiCMOS-pilot line, #029  
20 N-terminal residues, #076  
25,000 dalton heat shock protein, #002  
2D-NMR NOESY technique, #076  
4-phosphate (PI 4-P) phosphatase, #086  
400 W laser, #014  
40,000 dalton protein, #002  
III-V halbleiter, #013  
III-V semiconductors, #013

A

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abnormalities, chromosomal structural, plants, #026  
absorption spectrometry, atomic, #003  
absorption spectroscopy, #095  
accelerators in CERN, DESY, #008  
acetobacter, #003  
acids, organic, #003  
acoustic sensors, quality control, signals, #064  
acoustical diagnostics and quality control, #064  
acoustical testing, #064  
actuators, #047, #055  
actuators, piezoelectrical geared, #043  
adaptation and addiction research, #016  
addiction and adaptation research, #016  
addictive research, #016  
adhesion, #504  
aerobic bacteria, #003  
aerobic high performance fermentation, #003  
aeroles, atmospheric, #007  
aerology research, #202  
aerosol particles, atmosphere, #037  
agrichemicals, #027  
air chemistry, #065  
airborne experiments, #004  
algebraic geometry and number theory, #091  
algebraic number theory, #091  
algorithms for simulation, #004  
alkaloids, #027  
alloys, #051  
alpha 1-antitrypsin gene, and deficiency, #085  
alternatives to animal experiments, #016  
aluminum functional ceramics, #014  
amorphous metals, #014  
anaerobic biocenoses, mesophilic and thermophilic, #003  
analog/digital-simulation f.intellig.sensors & circuit work, #054  
analysis of ecological systems, #003  
analytical electron microscopy, #067  
animal experiments, #016  
animal models for liver diseases, #085  
annealing, semi-conductors, #029  
anorganic and organic catalysis, #096  
anorganic monomeres and polymeres, #503  
anorganic polymers, #503  
anorganic-nonmetallic materials, #047  
antibody production, #002  
antibody production, monoclonal, #002  
antigen T, #085  
antioxidants and other stabilisators, #095

antisense mechanisms, stimulation of cell division by, #085  
antisense RNA (RNA111), #075  
antisense RNA expression, #085  
antitripsin, and gene, #085  
applicable circuit development, #054  
application-specific controllers, #048  
applied analysis and stochastics, #020  
applied landscape ecology, #003  
applied optics, #043  
applied polymer research, #044  
artificial plasma clouds experiments, #101  
artificial intelligence, #004, #055, #060, #061  
artificial photosynthesis, #072  
asteroids, #301  
astro-orientation of spacecraft and payloads, automatic, #004  
astronomical observations, #078  
astronomy, also extraterrestrial, #004  
astrophotography, #301  
astrophysics, #019, #078, #093  
asymmetric catalysis, #097  
asymmetric hydrogenation, #096  
asymmetric synthesis involving CO<sub>2</sub>, #072  
asymmetric synthesis (catalysts research), #096  
atmosphere, gaseous trace materials, #065  
atmospheric aerosols, #007  
atmospheric boundary layers, #037  
atmospheric circulation, #007  
atmospheric effects, #004  
atmospheric multi-phase chemistry, #065  
atmospheric physics, #032, #201  
atmospheric science, #037  
atom microscopy and raster tunnel, #083  
atomic absorption spectrometry, #003  
atomic layer structures, #067  
atoms, heavy, #089  
"Aurora" mission, #101  
autoimmune diseases, #002  
automatic focussing optic, #043  
automation, #046, #054  
automation concepts, #003  
automation process, #046  
automatization technology, #050  
autonomous replication of plP501, #075  
autotrophic plant material change processes, #026

B

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bacillus and yeast regulated gene expression, #026  
bacillus subtilis, #075  
bacteria, aerobic, #003  
bacteria, pathogenic, #076  
bacteriophage T7 RNA polymerase, #085  
balloons, captive in atmosph.research, #201  
baltic sea research, #031  
barley, #026  
bathymetry, #031  
bearing technology, ultra-precise, #043  
bent and plane crystals, #094  
BESSY II, #022  
BICMOS, #048  
BICMOS, SOI, nSGT, or CMOS, #029  
bio materials, #083  
bio-dressing, #003  
bio-organic and radio-pharmaceutical chemistry, #021  
bio-technology, #003  
bioaccumulation, biosorption, and metal desorption mechanisms, #003  
bioanalytics, #003  
biocenoses, mesophilic and thermophilic anaerobic, #003  
biochemical eco-toxicology, #056  
biochemistry and physiology of plant hormones, #027  
biochemistry of plants, and of natural products, #027  
bioconversion of sulfur compounds, #003  
biodiagnosics, #039  
bioengineering, #003  
biological detoxification, #002  
biological macromolecules, #039  
biological membranes, radiation initiated oxidation, #095  
biological regulation, #076  
biology, cell-, #002  
biology, molecular, #002  
biology of development and adaptation, #016  
biology of mammals and birds, #007  
biomedical basic research, #016  
bionics, #004  
biopharmacy of peptides, #016  
biopolymers, #003  
bioremediation, #002  
biosensors, #003  
biosignals, #003, #016  
biosorption, bioaccumulation and metal desorption mechanisms, #003  
biosphere, #003  
biosynthesis of alkaloids, #027  
biotechnological processes and practice, #003  
biotechnological systems, #003  
biotechnology, molecular, #039



biotechnology-relevant organisms, #003  
birds, biology, #007  
black holes, #079  
blood clotting, #087  
blood-brain barrier, #038  
bottom boundary layer, ocean, #031  
bottom core samples, sub-ocean, #031  
bottom properties, ocean, #031  
boundary layer and turbulence, atmosphere, #201  
break resistant hartstoff layers, #083  
broad band radiation, #024

C

=====

c conversion, #003  
C-C-coupling reactions, #096  
calamatic liquids crystalline phase types, #098  
calcitonin, #076  
calculation, failure-tolerant, #090  
cancer research, #002  
captive balloons in atmospheric research, #202  
carbohydrate metabolism in plants, #026  
carbon dioxide, #072  
cardiotone effects, #016  
carrier-fixed catalysts, #072  
CASSINI mission, #004  
catalysators (heterogenic) in environmental technology, #502  
catalysis, asymmetric, #097  
catalysis, complex, #096  
catalysis, coordination-chemical, #096  
catalysis, heterogene, #070, #502  
catalysis research, anorganic and organic, #096  
catalysts, carrier-fixed, #072  
catalysts, homogenous, and immobilized, #096  
catalytic properties of zeolite, #070  
catalytic reactions, #502  
catalytic transformation, #096  
catecholamines, #016  
CCD detector measuring station, #004  
CCD-sensors, #004  
cell and molecular biological methods, #085  
cell biology, #002  
cell communication, #016  
cell division regulation, #085  
cell division, stimulation of, #085  
cell immortalization, human, #085  
cell proliferation, #086  
cell structure changes, #027  
cell synchronization, #085

cell systems, #016  
cell transplantation, #085  
cell yeast production, #002  
cell-biological and molecular-pharmacological techniques, #016  
cells, high-efficiency, #010  
cells, human, epithelial and endothelial, #085  
cells, immobilized, #003  
cellular and molecular physiology, #080  
cellular components, #076  
cellular division, #086  
cellular growth, #002, #086  
cellular membrane, #086  
cellular modulators of receptor tyrosine kinases, #086  
ceramic systems, interfaces and microstructures, #067  
ceramic-ceramic compounds, #047  
ceramic-metal compounds, #047  
ceramic material, grain interfaces in, #083  
ceramics, #014  
ceramics, aluminum functional, #014  
ceramics technology, #047  
ceramics, structural, #083  
cereal grains, #026  
cermets, #047  
CERN, #008  
chain, polypeptide, #076  
chains, low albumin; poly-peptide, #076  
chaotic electron motions, #101  
chemistry, environmental, #003  
chemistry, macromolecular, #015, #504  
chemistry of the atmosphere, #065  
chemistry, quantum, #070  
chemodynamic parameters, #016  
chemolithoautotrophic and heterotrophic leaching of metals, #003  
chiral catalysts, #097  
chromatography, #003  
chromatography, gas-, #003  
chromosomal structural abnormalities, #026  
circuit and systems projection, #054  
circuit development, applicable, #054  
circuit-boards, lamination of circuitry, #015  
circulation and heart pharmacology, #016  
circulation research, #002  
circulation- and heart-research, #002  
cis/trans interconversions, #076  
civilization, effects of, #004  
clast, #022  
claw feed systems, #063  
clima simulation technology, #004  
climatological problems, #036  
clotting of blood, #087  
cloud formation, #037

cloud water, liquid phase, #065  
clusters and biological specimen, #022  
CMOS, BICMOS, SOI, or nSGT, #029  
CMOS control systems, #048  
CO<sub>2</sub> activation on transitional metals, #072  
CO<sub>2</sub> chemistry, #072  
coagulation, disturbed, #087  
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